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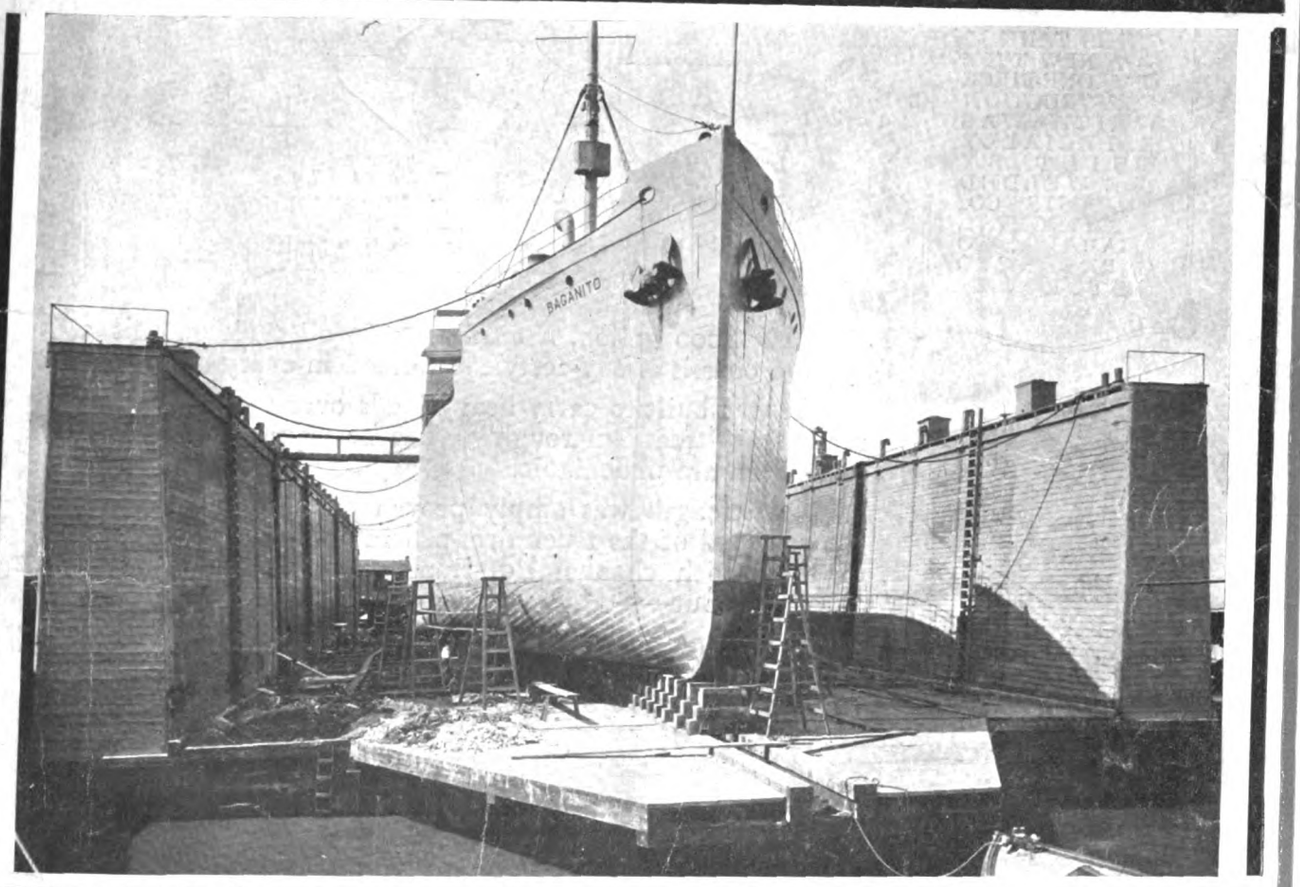

DRY DOCK ENGINEERS
CONSULTING — CONTRACTING
— DRY DOCK SPECIALISTS SINCE 1854 —
THE CRANDALL ENGINEERING CO.
EAST BOSTON MASS.

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THIS TANK IS A NEW TYPE OF ONE-PIECE CONSTRUCTION WHICH WAS ESPECIALLY BUILT BY THE WELDED PRODUCTS CO., BIRMINGHAM, ALABAMA, TO CARRY WOCO MOTOR OILS.

Truck Held Together By Welded Tank When Side Frame Breaks

THE 1,000 gallon, 4 compartment oil tank on this 3½ ton chassis is oxy-acetylene welded in every seam.

It was built to carry heavy loads over southern country roads that "treat 'em rough". The beauty and finish of the tank work are undeniable.

Its strength was amply proven on a recent trip when the rear end of the truck dropped into a deep ditch and one of the 6-inch channel side-frame members snapped clean through. But——

So strong and rigid was the welded tank that, from its 3-point suspension, it held the truck together and permitted it to run to the repair shop on its own power, supported by the tank.

Prest-O-Lite

DISSOLVED ACETYLENE

in its convenient portable cylinders is every day opening up to manufacturers new and important economies in metal working through the use of the oxy-acetylene process.

Why not tell Prest-O-Lite Engineers what sort of metal work you do? Very likely they can help you to make it stronger, better—and cheaper.

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Kohl Building, San Francisco
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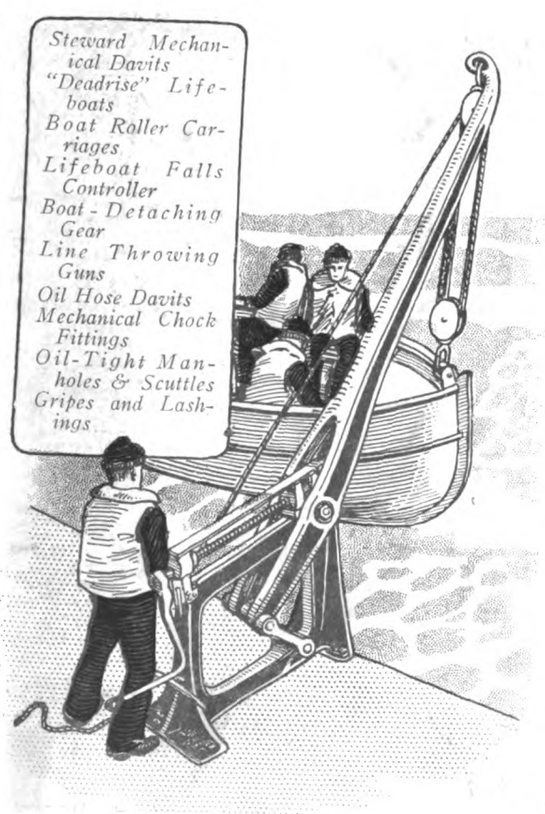
STEWARD
Life-saving Equipment
"Safety at Sea"



Strong, quick-acting
and easy to operate

Steward Mechanical Davits are the outgrowth of the modern idea of substituting a really efficient device for one whose continued use is merely time-worn custom. They are so designed that there is no possible chance of their failing to operate smoothly in any emergency. They require but one-tenth of the labor necessary to operate the old-style davits. They function positively and quickly and save time when seconds count.

Steward Mechanical Davits will handle standard, nested or banked lifeboats and are built for all sizes of boats, or can be adapted to meet special conditions. They have the approval of the United States Steamboat Inspection Service and the Classification Societies.

Let us tell you why you should standardize on Steward Davits. A post card inquiry will bring you full details.

Steward Davit & Equipment Corporation
17 Battery Place, New York
Colman Bldg., Seattle Sherwood Bldg. San Francisco

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Here's Proof of "The Universal Service"

ALASKA or Atlanta—no matter where you do business—you'll find one of the 40 Prest-O-Lite Plants and Warehouses your best and handiest source of acetylene supply.

Wherever repairs are needed, there you will find good welders using and depending upon

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas With The Universal Service

Prest-O-Lite Service goes wherever you can go; does any kind of a welding or cutting job for the least time and money cost.

Write for the Service Plan, It's Interesting

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FUEL OR CARGO WHICH?

The Elesco Fire Tube Superheater reduces fuel consumption and increases a ship's capacity for cargo. These facts are of vital importance because everybody knows that every foot of bunker space is one foot less for cargo.

Less bunker space is required on [illegible] equipped with Elesco Fire Tube Superheaters [illegible] use less fuel is burned.

Greater cargo space means more earnings.

Figure out what 12% less bunker space would be worth as cargo space.

With the Elesco Fire Tube Superheater it is possible to build vessels with 12% less bunker space—this space then becomes available for cargo and is an asset instead of a liability.

Locomotive Superheater Co.

Designers and Builders of Superheaters

Peoples Gas Building, Chicago 30 Church Street, New York

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This Welded 2-inch Pipe Stopped a Flood-Driven Barge

—*And Never Sprung a Leak!*

TO MEET a temporary situation, the load from a 6-inch high pressure gas main was put through this welded 2-inch pipe line, laid on temporary piling across a river.

Floods came, washed away the false structure of a new bridge, tore a barge loose from its moorings and hurled the entire mass down on this slender 2-inch pipe.

It held them all. Not a single leak developed.

Wherever strength, permanence and tightness are essential you will find joints are being *welded*—joined together "for keeps," using

Prest-O-Lite

DISSOLVED ACETYLENE

Nation-wide Prest-O-Lite Service brings straight to the user's hands a single cylinder of highest temperature gas—or hundreds of them.

Forty plants and warehouses insure Prest-O-Lite users prompt and adequate service; wherever located, there is an efficient Prest-O-Lite *producing* plant near.

1219

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ANNUAL SHIPBUILDING NUMBER

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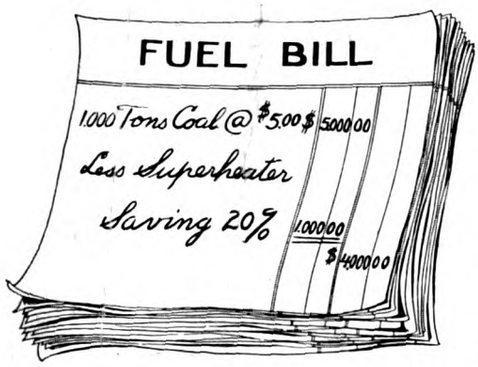
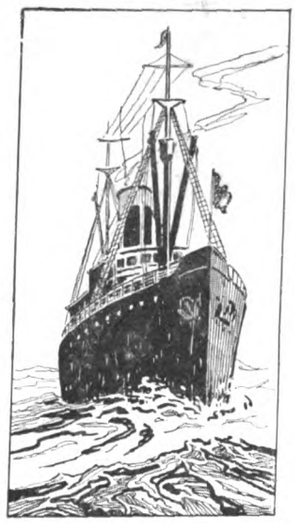


SUPERHEATING INCREASES EARNING POWER

Many a ship which today cannot profitably remain in service on account of its cost of operation, can be placed in the economical class by the application of Superheated Steam.



By installing fire tube superheaters furnishing high degree superheat they can be made to compete successfully with modern vessels.

Fire tube Superheaters can be installed while in port without loss of revenue service.

12 to 20% reduction in fuel costs immediately follows.

Locomotive Superheater Co.

Designers and Builders of Superheaters

Peoples Gas Building, Chicago 30 Church Street, New York

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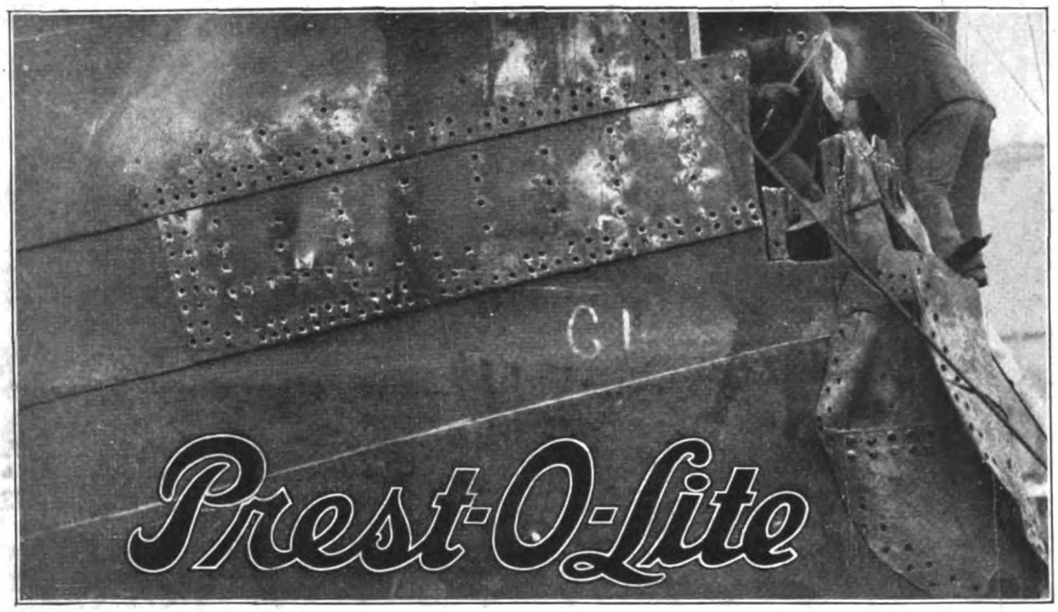

Quick repairs to the smashed bow of one of the United States Emergency Ship Corporation's vessels

The Rivets Have Been Burned Out

CONSIDER the ease with which Oxy-acetylene accomplishes the most trying operation that comes to any ship-yard—repair work on framing and plating.

Compare this modern method of cutting out rivets, of severing frames, of sundering plating to the obsolete method of the cold chisel, drill and hack-saw. It's like comparing the craft of Columbus to the enormous ships of to-day.

In the ship-yards, in fact wherever welding and cutting is done

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas With The Universal Service

is the *one* supreme gas to use in welding and cutting operations.

And advantageous as this ease of cutting out damaged parts with the oxy-acetylene blow-pipe is, this splendid tool has also the power to join the metals together again, and the joining will have all the qualities of the metals joined.

There are so many reasons why Prest-O-Lite is especially adapted for the particular work of ship-yards that we invite you to ask us all of them.

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In *Your* Plant On *Our* Payroll

is an army of specialists comprising the Oxweld Organization.

Engineers, chemists, master-welders and cutters, metallurgists, production experts—these men are ready to roll up their sleeves in *your* plant, to tackle and solve *your* problems.

They stand ready to apply to your individual case the great fund of accurate, up-to-the-minute information that Oxweld has gathered the world over.

Only this company has such exhaustive knowledge of every phase and application of oxwelding and cutting; and this organization has the facilities to share this knowledge with you promptly, effectively and freely.

There are Oxweld Sales Service Centers in more than 50 large cities ready to send an expert to your plant to help solve your production problems.

Write, wire or telephone to any of the addresses below for immediate attention from the nearest Service Center.

OXWELD ACETYLENE COMPANY

Newark, N. J. Chicago Los Angeles

World's Largest Maker of Equipment for Oxwelding and Cutting Metals

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CHANGELESS

THE hair-like lines of the thumb print are unalterable, changeless.

Because of the exacting accuracy and painstaking care made possible by the vast Linde organization, Linde Oxygen is as constant in quality as is the thumb print. To-day, to-morrow, next year—the high standard of Linde purity is invariable.

Successful Welding demands uniformity—in practice, in equipment, in gases.

That is why it is so important to use oxygen of extremely high purity *which never changes.*

The Largest Oxygen business in the world is the result of living up to these two requirements.

The
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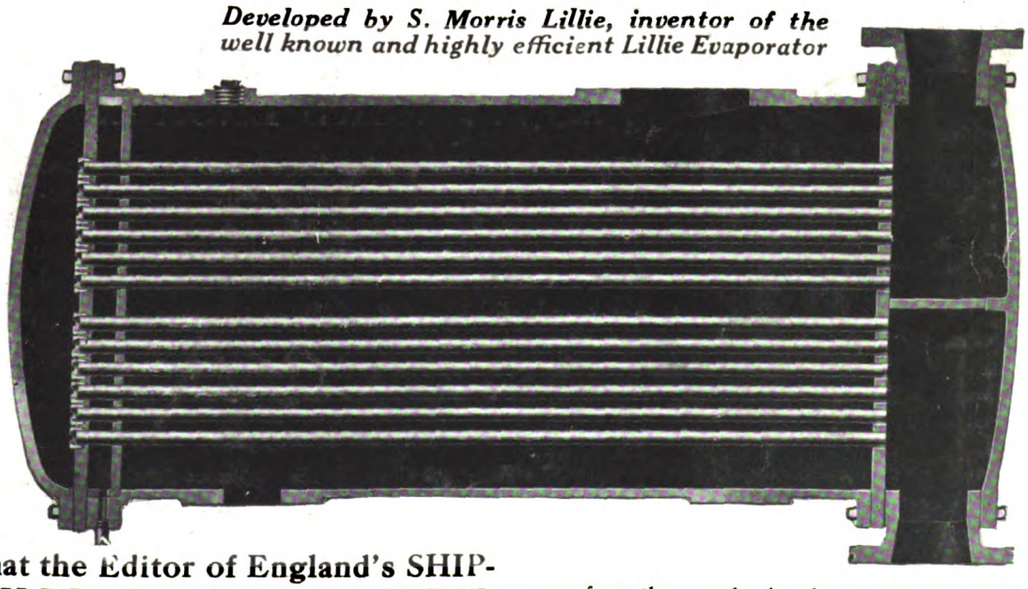
ANNOUNCEMENT!

A New WHEELER Condenser which eliminates leakage troubles

Developed by S. Morris Lillie, inventor of the well known and highly efficient Lillie Evaporator



What the Editor of England's SHIP-BUILDING AND SHIPPING RECORD Says About This Improved Wheeler Condenser

"An analysis of the feed water after a long voyage will generally reveal traces of sea water, showing that the circulating water has to a lesser or greater extent become mixed with the exhaust in the condenser, and as the need for repacking the tubes becomes greater, the amount of leakage tends to increase. With a view to removing the possibility of this, a new condenser has been designed by an American firm in which the usual type of packed tube joint between the circulating water and the steam is removed. At one end of the condenser the tubes are expanded into the tube plate in the usual way, at the other end the usual type of packed joint with ferrules is fitted, but a diaphragm plate is added a short distance away from the actual tube plate on the steam side, the tubes being a sliding fit through this diaphragm. At the bottom of the narrow space between the tube plate and the diaphragm a drain pipe is fitted leading to a small pump or a vacuum trap, so that any leakage of the circulating water past the ferrules and the packing trickles down to the bottom of the space and is drawn off by the drain. Thus any leakage does not pass beyond the diaphragm into the main body of the condenser, and the condensate is not contaminated. The device seems a particularly good one, and in addition to avoiding trouble with the feed water, should reduce the frequency with which condenser tube joints need to be packed."

Full information on request

WHEELER CONDENSER & ENGRG. CO.
Carteret, N. J.
Manufacturers of Complete Condensing Equipment

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AS FLEXIBLE AS A LINER'S ENGINES

PREST-O-LITE service functions like the giant liner's engines. In harbor these smoothly revolve at a snail's pace, yet at a signal instantly develop their maximum horse power. It matters not what the emergency is these steam wonders respond efficiently, and just when needed.

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas with the Universal Service

is marketed through an organization which, like the liner's engines, is flexible because it is designed to efficiently serve not only the thousand cylinder consumption of one plant, but equally well the one cylinder requirement of another.

Ask us for details concerning the facilities of our 40 plants and warehouses.

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Used Extensively
by the United States Navy

A single order for the Portsmouth (Va.) Navy Yard specified more than 1,400,000 pounds.

Our strength and yardage guarantees were higher than those of other manufacturers and our deliveries were in excess of our promises.

Users of WHITLOCK CORDAGE for Marine or other purposes are assured of uniformly satisfactory service.

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DOWN THE "TRADES"

THE service plan of Prest-O-Lite is more constant than the north-east trade winds—winds which constantly blow and upon which, from the time of the Vikings, navigators have depended for propelling their ships—Also like the "trades" it is wonderfully flexible for

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas with the Universal Service

has a service plan which adapts itself to every fluctuation of the welding and cutting industries—ample for all—yet if only one cylinder of Prest-O-Lite gas is needed the service functions as efficiently.

You will be interested in the facilities of our 40 plants and warehouses—Ask us for all details.

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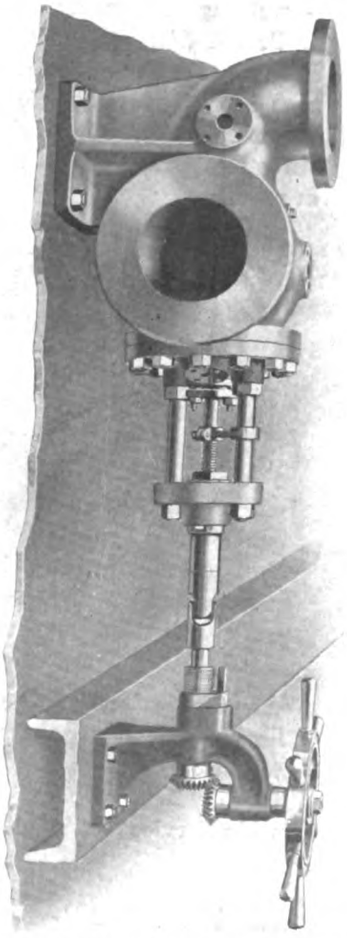
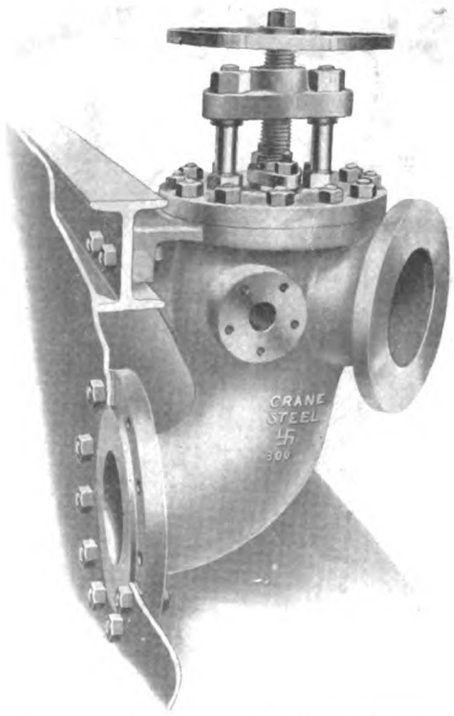
CAST STEEL

Stop and Throttle Valves
For Marine Service



We can supply any valve or fitting for ship use. Here are shown two examples of our facilities for taking care of shipbuilders' requirements.



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FOUNDED BY R. T. CRANE, 1855

CRANE CO.

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CRANE LIMITED — MONTREAL, TORONTO, VANCOUVER, WINNIPEG, LONDON, ENG., SYDNEY, N. S. W., QUEBEC, HALIFAX, OTTAWA, CALGARY

We are manufacturers of 20,000 articles—valves, pipe fittings, steam specialties, etc.—for all phases of power plant equipment, and are distributors of pipe, heating and plumbing materials.

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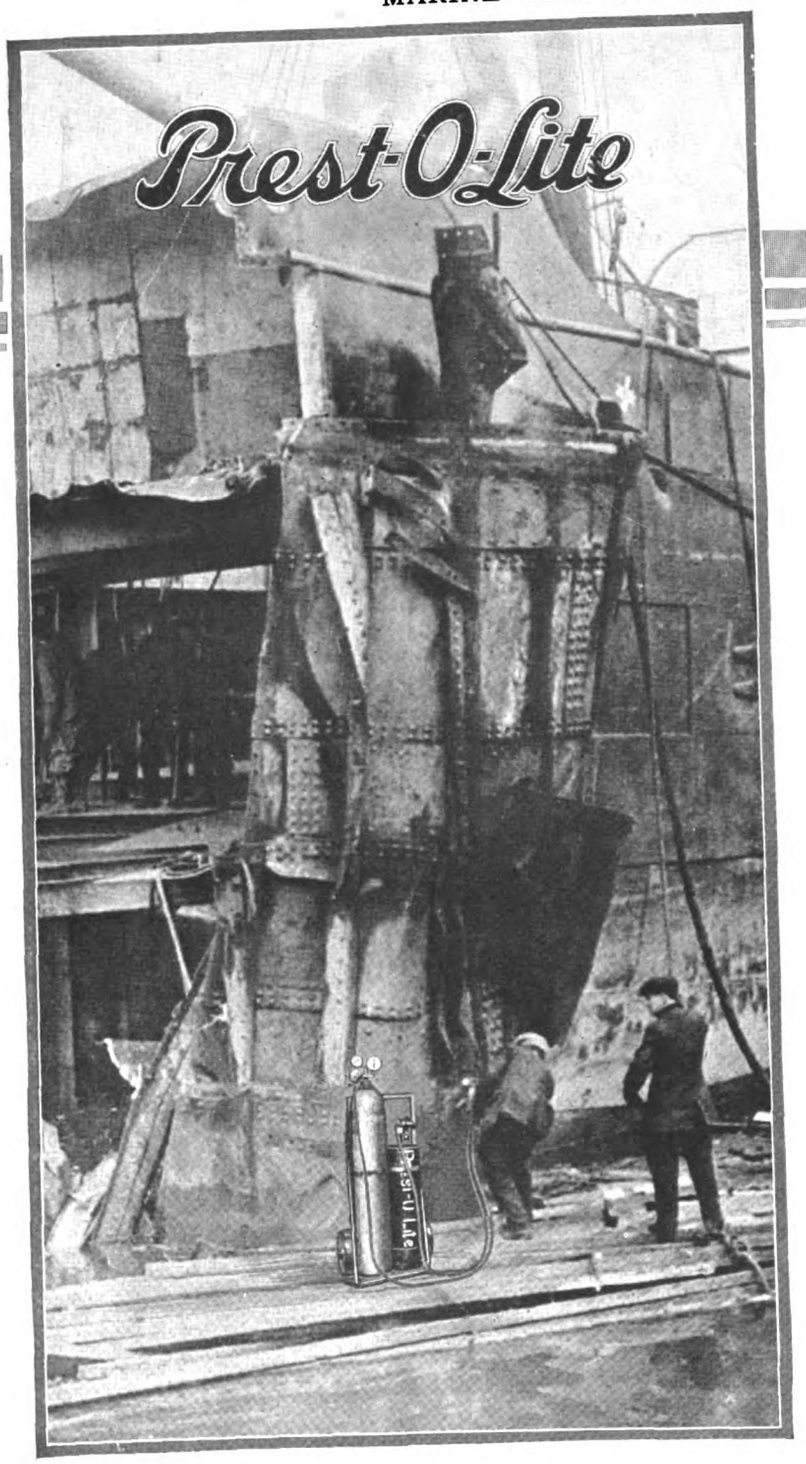

PREST-O-LITE THE PORTABLE

IT matters not *where* the welding and cutting job is, Prest-O-Lite is available. The ship repair work shown here is but one example of Prest-O-Lite portability. Afloat—ashore—anywhere—everywhere.

Prest-O-Lite
DISSOLVED ACETYLENE

THE UNIVERSAL GAS WITH THE UNIVERSAL SERVICE

is the choice of thousands upon thousands of welders who from long experience have learned that this gas produces perfect welds and cuts.

Our forty plants and warehouses have ample capacity to fill every demand. Write for details of our Nation-wide Service Plan.

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AUGUST, 1920

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INVESTIGATE Electric Heating of Rivets!

You cannot disregard modern advancements

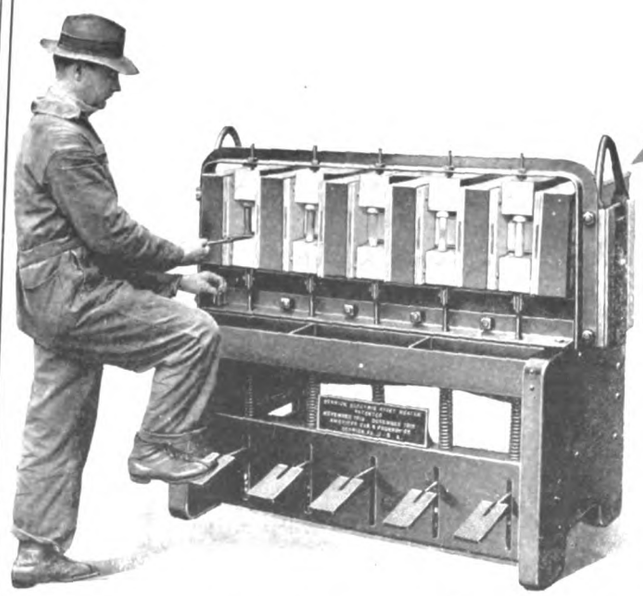
Electric heating of rivets is now the leading thought in progressive plants.

—Improved working conditions (elimination of smoke and gas) saves 12% working time for hammer gangs.

—Elimination of excessive heat stimulates production.

—75% fuel saving and 80% saving in cleaning vessel hulls means lower construction costs.

The Berwick Electric Heater is the latest big opportunity to save money and increase production. Guaranteed to heat any size or type of rivet within less than 20 kilowatt-hours per hundred pounds of rivets heated; likewise guaranteed for one year against defective material.



Send for this booklet

It describes 11 standard Heaters for rivets from 1/4" to 3/8" by 2" up to 1" to 1 1/2" by 10" or larger. Capacities up to 600 hot rivets per hour.

Developed and perfected for our own 15 plants, the Berwick Heater is now offered for your advantage and profit. Four hundred Heaters sold since January 1st. If **you** are progressive, why wait? Send for catalogue and tell us your alternating current conditions and sizes of rivets used.

American Car and Foundry Company

165 Broadway, New York

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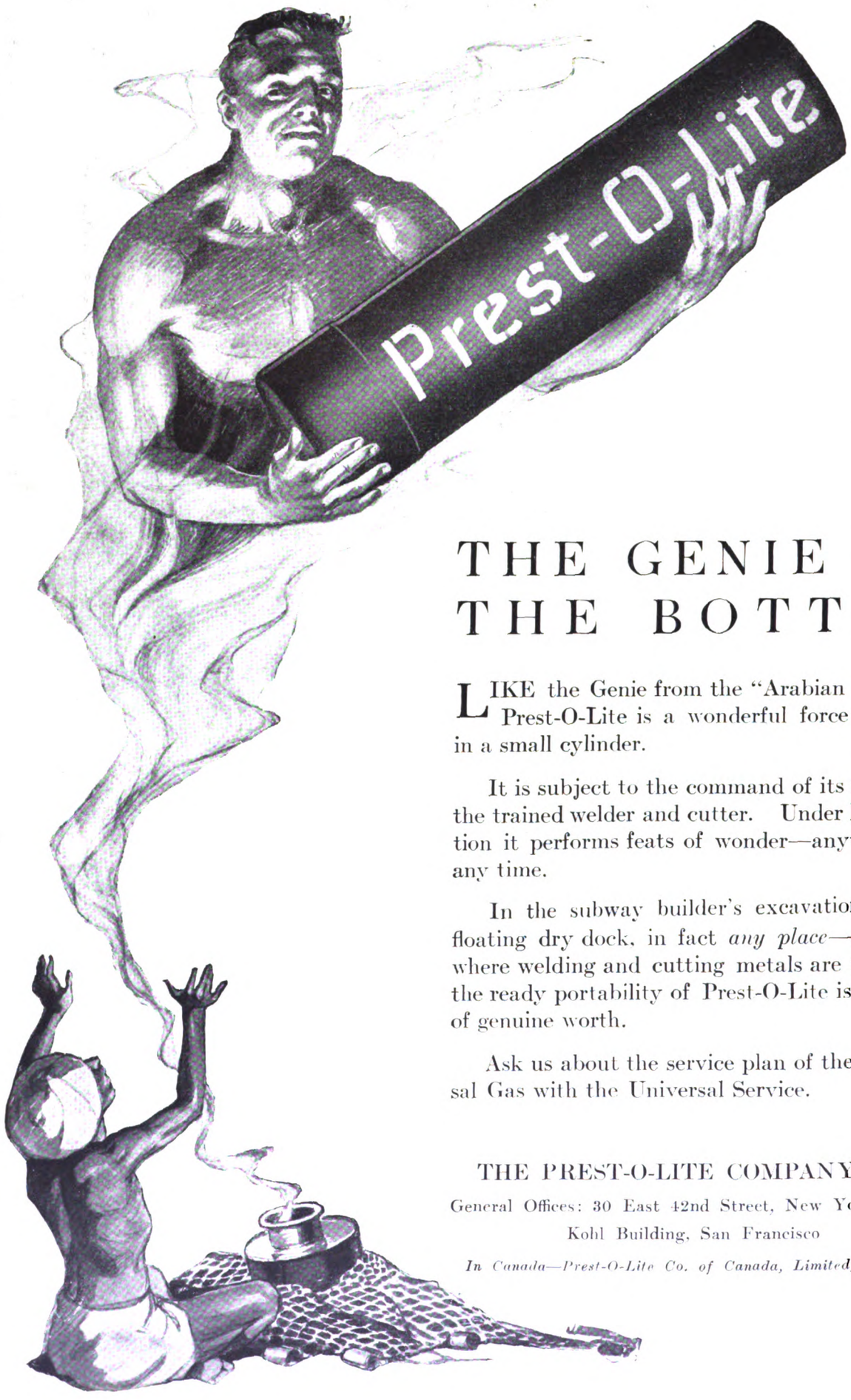

THE GENIE OF THE BOTTLE

LIKE the Genie from the "Arabian Nights", Prest-O-Lite is a wonderful force confined in a small cylinder.

It is subject to the command of its master—the trained welder and cutter. Under his direction it performs feats of wonder—anywhere, at any time.

In the subway builder's excavation, in the floating dry dock, in fact *any place—any time* where welding and cutting metals are required, the ready portability of Prest-O-Lite is an asset of genuine worth.

Ask us about the service plan of the Universal Gas with the Universal Service.

THE PREST-O-LITE COMPANY, Inc.

General Offices: 30 East 42nd Street, New York, N. Y.
Kohl Building, San Francisco

In Canada—Prest-O-Lite Co. of Canada, Limited, Toronto

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Marine Engineering

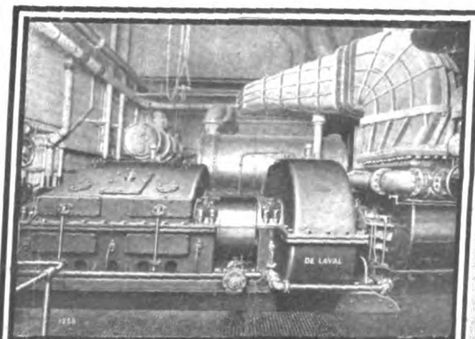
Reliability of De Laval Gearing in Ships

OVER 2,000,000 hp. of De Laval reduction gearing has been produced, delivered and installed on board vessels of different descriptions. The first reduction was put in service in June, 1917, and up to the present there has not been a replacement of any De Laval gear or pinion, and not a single De Laval reduction gear has shown any sign of needing replacement.

These reduction gears are of both the single- and double-reduction types, and have been installed in merchant vessels as well as in war vessels.

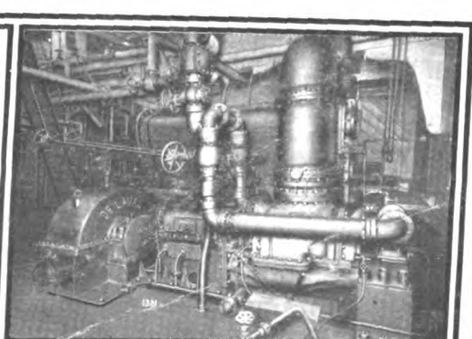
We shall be glad to give you names of vessels equipped with De Laval gears and to submit estimates upon geared turbines for ships in which you are interested, if you will give us full particulars as to speed, power and service.

Ask for our Marine Catalog M-46.



De Laval 3,000 hp. geared marine turbine, as installed in a series of 8,800 to 12,000 ton vessels, 3,000 hp. at 90 r. p. m.

De Laval Steam Turbine Company
Trenton, N. J.



De Laval steam turbine with double reduction gear, installed in twin screw wooden schooner, 750 hp., 130 r. p. m.

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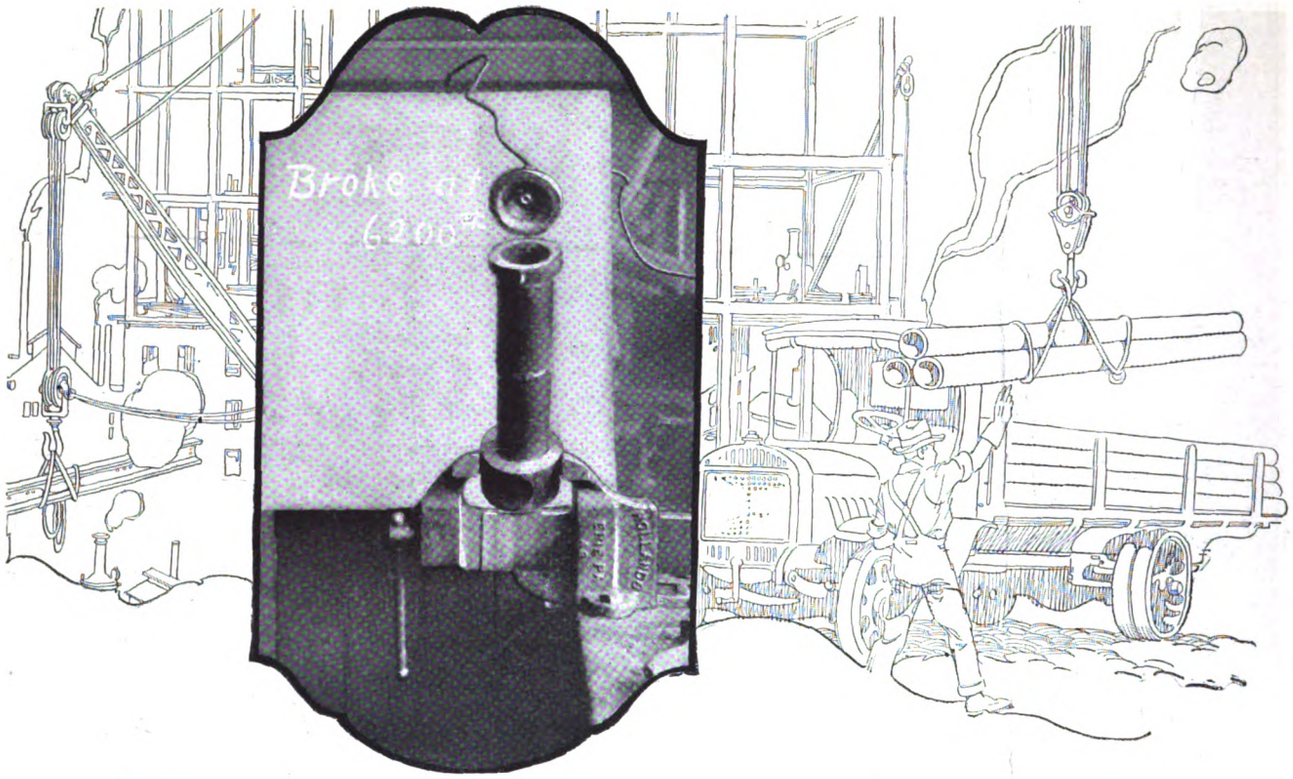

The cap broke at 6,200 pounds

THE Oxy-acetylene welded joint in this test length of pipe easily held a hydrostatic pressure of 6,200 pounds. At this high pressure the cap blew off, but the weld withstood the pressure without an indication of failure.

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas with The Universal Service

was of course used exclusively in making these welds.

This test proves again the fact that for permanency—for strength—for perfect welds—Prest-O-Lite is the surest choice.

Ask us all about Prest-O-Lite and the Nation-Wide Service of our forty plants and warehouses.

THE PREST-O-LITE COMPANY, INC.
GENERAL OFFICES, CARBIDE AND CARBON BUILDING
30 EAST 42ND STREET, NEW YORK
KOHL BUILDING, SAN FRANCISCO
In Canada
PREST-O-LITE CO. *of* CANADA, LIMITED, TORONTO

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OCTOBER, 1920

Marine Engineering

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WHY A *GYRO* COMPASS?

BECAUSE ITS USE INSURES:

GREATER SAFETY,
LESS USE OF HELM,
CLOSER FOLLOWING OF CHOSEN COURSE,
A SHORTER VOYAGE,
WITH RESULTANT FUEL ECONOMY,

HOW IS THIS POSSIBLE?

Because The Gyro Is The Most Accurate Type Of Compass.
Why Is It So Accurate?
Because, First Of All:
It Utilizes A Strong And Constant Directive Force Which Has Neither Variation Nor Deviation.
Secondly:
It Indicates The True North.
Thirdly:
It Responds Immediately To A Change In Heading.
Fourth:
It Is Built With Infinite Care

Other Vessels Are Proving The Success Of Steering By Gyro—

WHY NOT *YOURS*?

THE SPERRY GYROSCOPE CO
LIMITED
BROOKLYN, N.Y.

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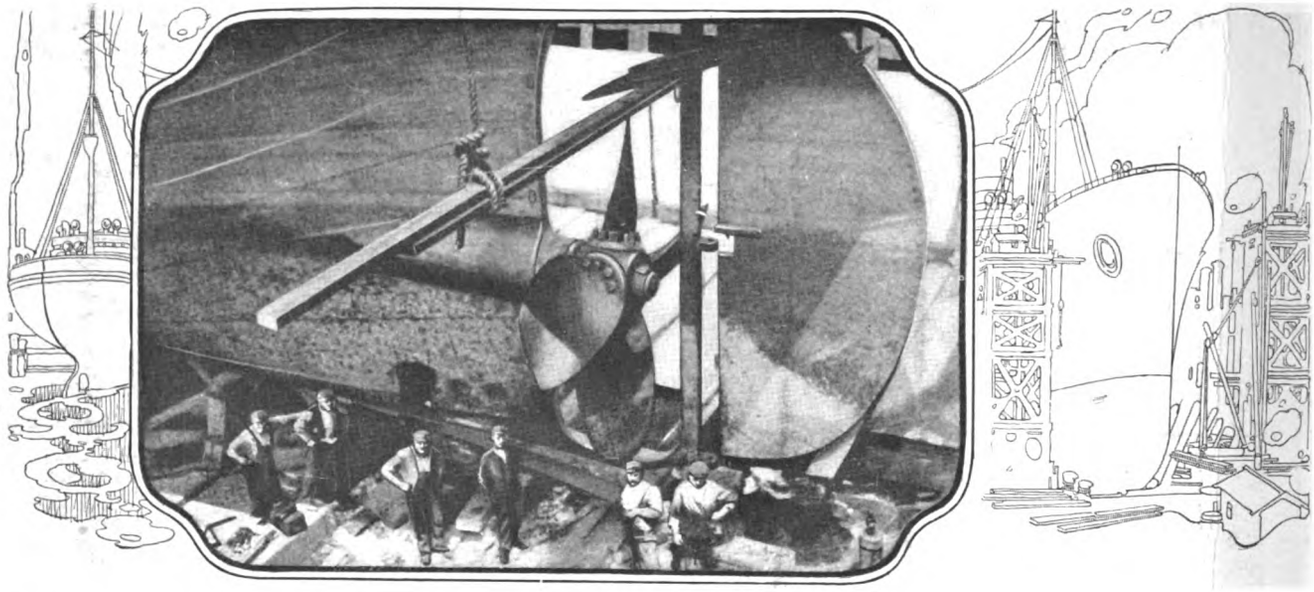

Launched again in Seven Hours thanks to Prest-O-Lite

BECAUSE of the extreme portability of Prest-O-Lite it was comparatively simple to weld the broken 20-ton stern post of this vessel.

The break was welded in less than seven hours by two operators; the cost was negligible in comparison to the expense of replacing a new stern post.

This is only one example of the way Prest-O-Lite and the oxy-acetylene process accomplishes wonders in the shipyard as well as anywhere else.

Ask us about the Nation-Wide Service of our forty plants and warehouses.

THE PREST-O-LITE COMPANY, Inc.
General Offices: Carbide & Carbon Bldg., 30 E. 42nd St., New York City
KOHL BUILDING, SAN FRANCISCO

In Canada: PREST-O-LITE CO. OF CANADA, *Limited*
TORONTO

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Engineering Library

Marine Engineering

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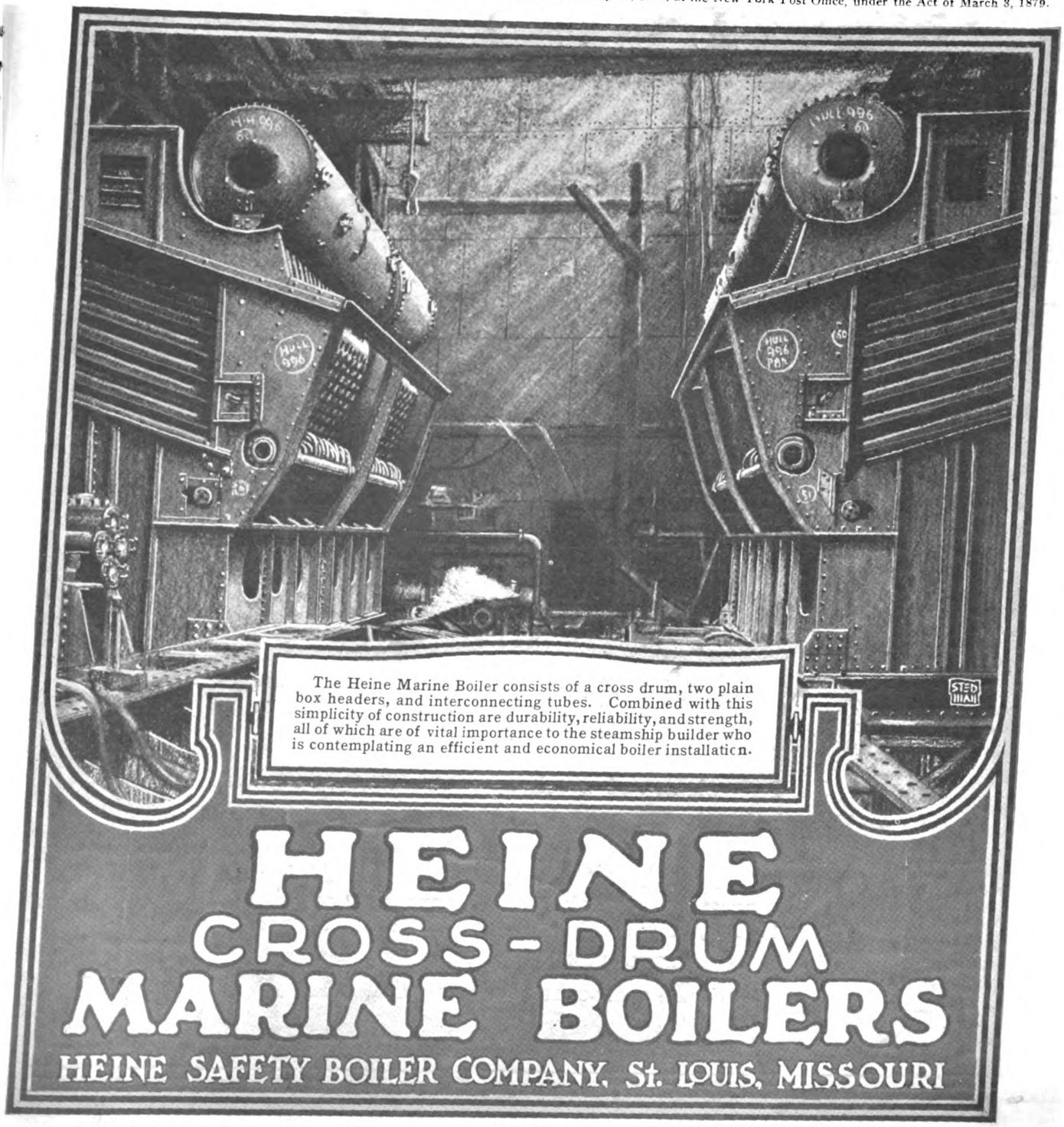

The Heine Marine Boiler consists of a cross drum, two plain box headers, and interconnecting tubes. Combined with this simplicity of construction are durability, reliability, and strength, all of which are of vital importance to the steamship builder who is contemplating an efficient and economical boiler installation.

HEINE
CROSS-DRUM
MARINE BOILERS
HEINE SAFETY BOILER COMPANY, St. LOUIS, MISSOURI

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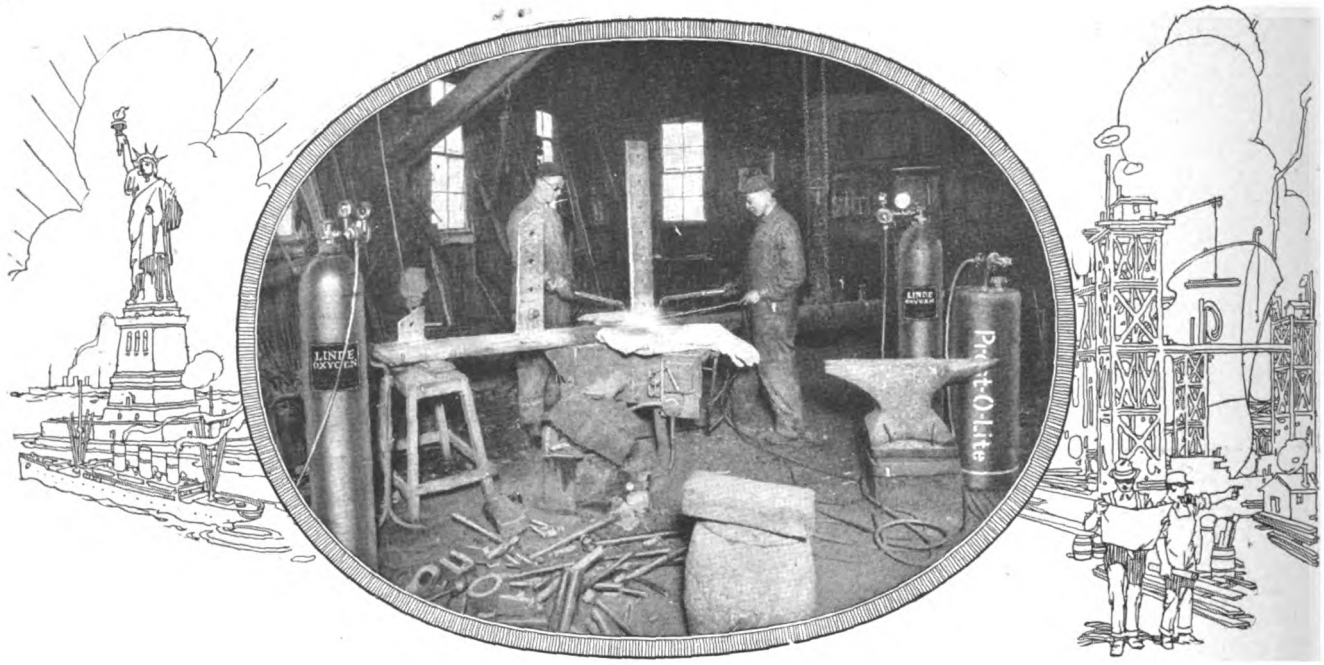

Prest-O-Lite for Shipbuilding

THERE are few parts of greater importance to any kind of vessel than its rudder.

And there are few structures subjected to more sudden and violent strains than the rudder of a powerful tug boat.

It has been proved conclusively that rudder arms welded to the rudder post by oxy-acetylene are as nearly perfect as this sort of construction can be—in fact post and arms, in strength and resiliency, are equivalent to one piece of metal.

This is only *one* of hundreds of possible and permitted applications in Ship Building and Repair work.

The extreme portability of Prest-O-Lite and its unfailing quantity and unvarying quality make it the ideal welding gas for use in all metal working shops.

Our forty plants and warehouses can serve you *anywhere* and *everywhere*.

THE PREST-O-LITE COMPANY, Inc.

General Offices, Carbide & Carbon Bldg., 30 E. 42nd St., New York City

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Marine Engineering

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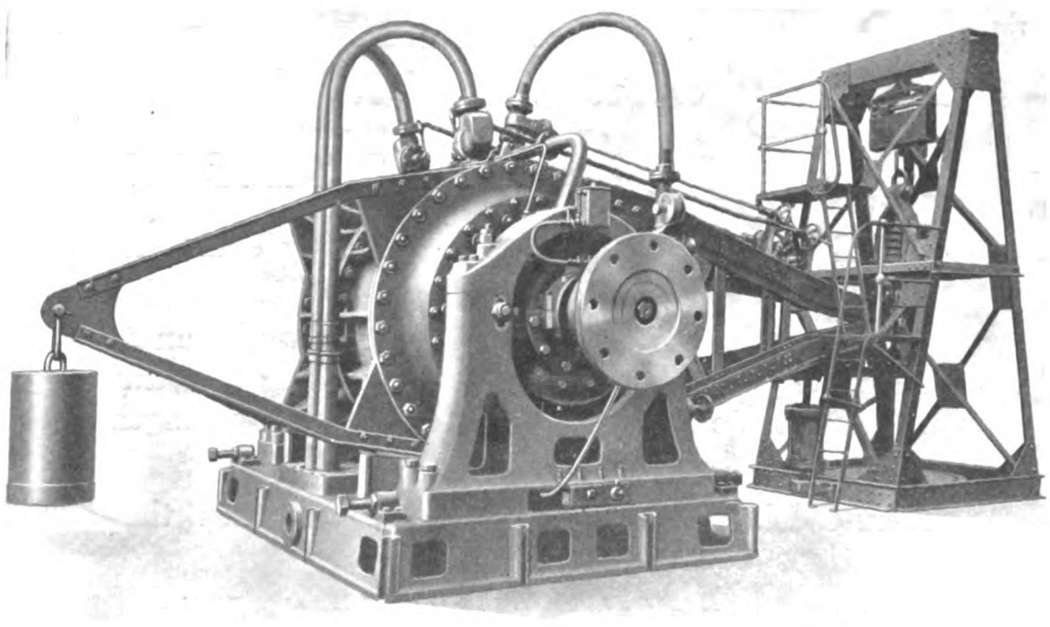
FROUDE

HYDRAULIC ABSORPTION

DYNAMOMETERS

HAVE BEEN SUCCESSFULLY EMPLOYED IN ALL COUNTRIES



Froude Reversible Dynamometers. 4,000 B. H. P. Capacity at 180 RPM.

BUILT IN ALL SIZES FOR TESTING ROTARY PRIME MOVERS OF ALL TYPES AT ANY SPEED EITHER CONTINUOUSLY OR INTERMITTENTLY
ABSOLUTE AND SCIENTIFIC ACCURACY
SILENT OPERATION
VARY LOAD OR SPEED WHILE OPERATING
SIMPLE COMPUTATION OF POWER
LARGE CAPACITY RANGE IN EACH MACHINE

WRITE FOR BULLETIN F-70

C. H. WHEELER MFG. CO.

PHILADELPHIA, PA.

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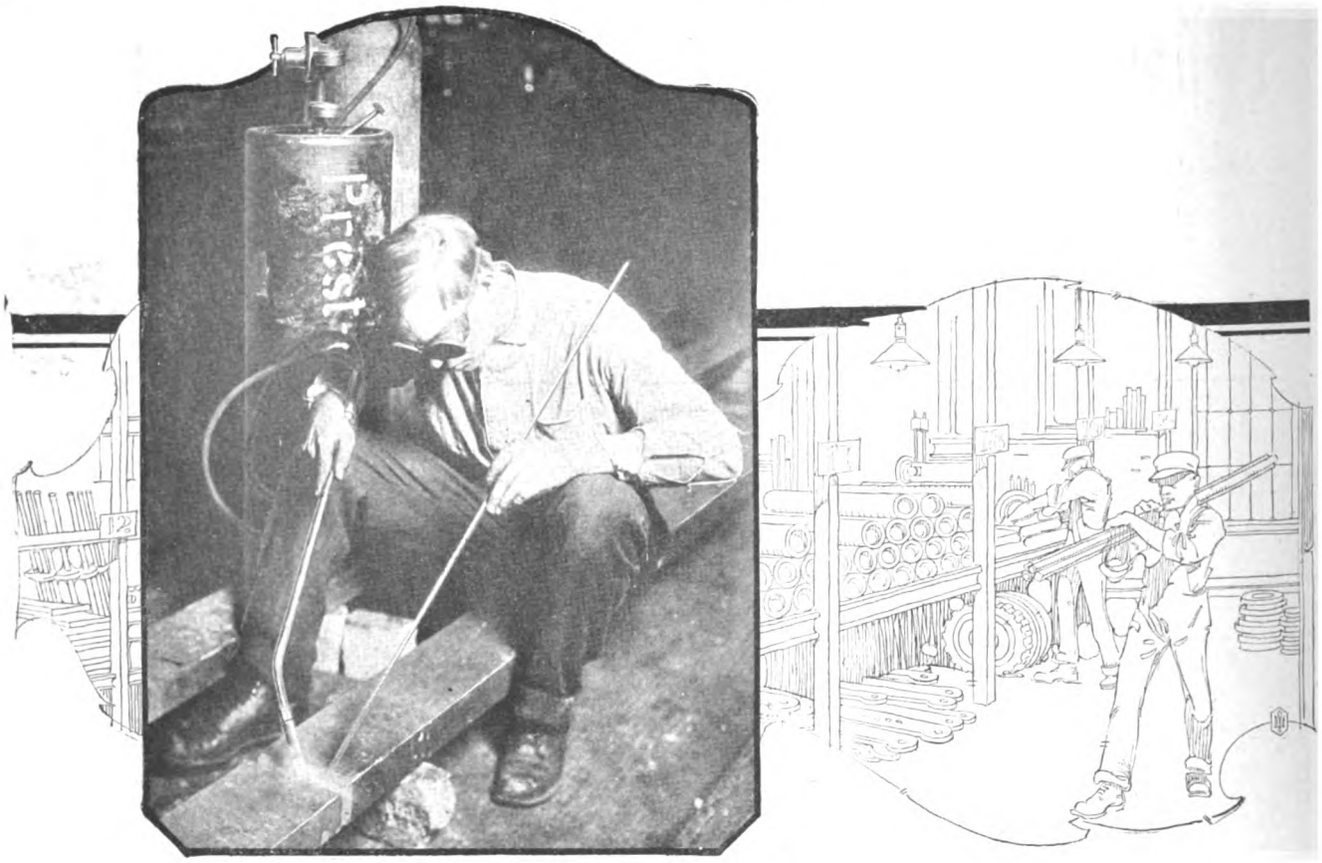

Cutting and Welding in the Stock Room

THE biggest stock room cannot carry every size and length of metal.

It is easy though for any intelligent workman to master oxy-acetylene welding and cutting and thus without waste lengthen or shorten, to any length, any stock metal on hand.

Prest-O-Lite makes it possible to perform these operations *anywhere*.

Let us tell you *all about* Prest-O-Lite, the Universal Gas with the Universal Service, and how our forty plants and warehouses can serve you.

THE PREST-O-LITE COMPANY, INC.

GENERAL OFFICES, CARBIDE AND CARBON BUILDING

30 EAST 42ND STREET, NEW YORK

KOHL BUILDING, SAN FRANCISCO

In Canada

PREST-O-LITE CO. *of* CANADA, LIMITED, TORONTO

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Save your COAL *by insulating your* HEAT

HERE'S the "85% MAGNESIA" Heat Insulation that *saves* from a quarter to a third of your costly coal.

If you own a power or heating plant—large or small, you are vitally interested in the *coal saving* value of this unsurpassed Pipe and Boiler Covering.

Every few months this "85% MAGNESIA" covering saves enough coal to pay its own cost. This saving goes on year after year because "85% MAGNESIA" is practically indestructible with ordinary usage.

Just how much coal you can save depends upon certain conditions. The exact amount is shown in the Table of Monthly Savings compiled by the Mellon Institute of Industrial Research, and sent on request by the—

Who Uses "85% Magnesia"?

For Power

All the ships of the U. S. Navy. The U. S. Shipping Board and the principal steamship lines. The leading railroads and locomotive builders, power plants, factories and users of every kind of steam power.

For Heating

The Capitol, White House and Government buildings in Washington (D. C.). The most famous Municipal and Public buildings. The best known Hotels, Skyscrapers and other large buildings. Owners of homes, large and small.

In fact, wherever heat is to be conserved, "85% Magnesia" is recognized as the standard heat insulation.

MAGNESIA ASSOCIATION *of* AMERICA, 721 Bulletin Building, Philadelphia, Penna.

EXECUTIVE COMMITTEE, W. A. Macan, *Chairman*

George D. Crabbs, The Philip Carey Co., Cincinnati, Ohio
J. R. Swift, The Franklin Mfg. Co., Franklin Penna.
Alvin M. Ehret, Ehret Magnesia Mfg. Co., Valley Forge, Penna.
Richard V. Mattison, Jr., Keasbey & Mattison Co., Ambler, Penna.

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TRADE PUBLICATIONS

Brownhoist Locomotive Cranes are described and illustrated in Catalogue K-1919, published by The Brown Hoisting Machinery Company, Cleveland, Ohio. The introduction to this catalogue is as follows: "The locomotive crane has become a necessity in railroad, shipbuilding, contracting, steel, coal, lumber, shipping, mining, foundry and manufacturing industries. It is a necessity in any business where there is enough material to be handled to warrant the expenditure. It is a tool that works day and night, and it does this work at a much less cost than when hand labor is used. The daily cost of a Brownhoist locomotive crane under normal conditions is approximately $10, which includes depreciation, 6 percent interest on the investment, and all operating costs. This is figured with the crane working ten hours a day for three hundred days in the year, and if the crane is worked more than this the daily cost will be reduced. This crane does the work of a number of men, in some kinds of work replacing as many as forty to fifty laborers. Its value to the railroad contractor, manufacturer, and steel, coal, lumber, shipbuilding, shipping, mining and various other industries is illustrated on the following pages. This catalogue illustrates the standard types of Brownhoist locomotive cranes and the different operations, showing how and where some of the cranes are used. Brownhoist locomotive cranes have been used for over a quarter of a century, and to-day these cranes are found in all parts of the world. Their records prove them to be safe, speedy and durable. Many Brownhoist cranes have been in continuous service for twenty and twenty-five years and even longer, and they are still at work. It requires a good crane to do this."

"Sargent Marine Hardware" is the title of a catalogue published by Sargent & Company, New Haven, Conn. The book deals particularly with hardware that is used for cabin and saloon fittings, such as knobs, locks, hook, window fastenings, grab rails, locker fittings, bolts, sash balance, pulleys, telegraph hooks, etc.

The Electric Rivet Heating Forge manufactured by The United States Electric Company, New London, Conn., is described as follows in a circular the company has recently issued: "This forge was designed and built to meet the requirements of shipbuilders, structural steel builders and boiler manufacturers, and wherever it is necessary to use hot rivets from ¾ inch to 1¼ inches diameter, 3-inch shank; the time for heating being from seven to fifteen seconds, and at a very low cost. The electrodes are arranged to heat two rivets at one time, delivering four 1-inch rivets per minute, which is as fast as they are required. The rivets are brought to the proper heat entirely free from scale, and are passed on to the riveter. The pan of the forge is designed to hold a keg of rivets in front of the operator or heater, and the rivets are easily placed by hand in the electrodes and removed with the tongs when heated. This operation is very simple, the conductor being operated either by foot or hand lever, bringing the electrode in contact with the point of the rivet or rivets to be heated, pressing down on the lever, and, when the desired heat is reached, the conductor goes back by removing the pressure on the lever. This method of heating rivets eliminates the following: Loss of time in starting forges in the morning and at noon time; loss of burned rivets; breaking and carrying of coke and fuel for forges; air hose and air where same is used to blow up the fires, fittings, etc. Smoke and gases in close compartments on ships, boilers, etc. The forge is supplied at a small additional cost, with a set of electrodes and 20-foot leads covering a surface of 20 feet, which can be used in heating loose rivets or rivets that have not been driven solid, reheating the rivets in the plate or structural part without removing them and driving them up tight."

American Glue Company

BUSINESS ESTABLISHED BY ELIJAH UPTON IN 1808

Manufacturers of

UNION *Abrasive Paper and Cloth*

AMMUNITE discs and belts for grinding and polishing hard metals. UNION Garnet Paper and Cloth for finishing hard wood floors and decks. NEW ENGLAND FLINT for general wood-working uses. UNION Emery Cloth for metals.

Hard, sharp, evenly coated crystals, backed by the proper weight of tough rope paper, or the best woven Drills, Jeans, and Duck Cloth. Set hard and fast by the finest grade of glue we make. When we say "cut faster" and "last longer" there is something behind our boast. Let us prove it to you.

UNION Hide and Bone Glues for All Purposes

UNION Marine Glue for paying decks of vessels and similar marine purposes. Good in Arctics or Tropics. An excellent filler for floors.

Write Us Today For Samples

AMERICAN GLUE COMPANY

121 Beverly Street, Boston, Mass.

BRANCH STORES

New York Philadelphia Chicago St. Louis San Francisco

FACTORIES FROM COAST TO COAST

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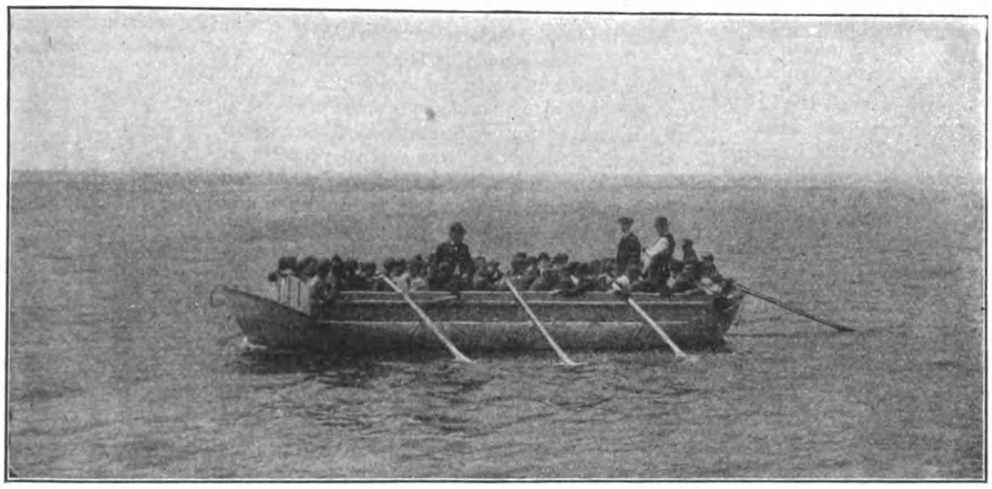
SAFETY AT SEA



Lundin Lifeboats constantly prove their worth in disasters at sea, where unusual seaworthiness, reserve buoyancy, and protection of occupants make them a real refuge in time of need.

For many years we have specialized in the manufacture of

LUNDIN DECKED LIFEBOATS **WELIN QUADRANT DAVITS**

and many other highest grade

LIFE SAVING APPLIANCES

We also manufacture all Balsa products. Encysted Balsa is the only insulating material having structural strength. It is used most successfully for ships' ice boxes, cold rooms, and all manner of insulated compartments of ships.

American Balsa Company, Inc.

WELIN MARINE DEPARTMENT

50 East 42nd Street **New York, N. Y.**

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Electric Traveling Cranes, Portable Electric Hoists, Standard Monorail Hoists and Trolleys are among the various types of apparatus described in a catalogue published by the Shepard Electric Crane & Hoist Company, Montour Falls, N. Y. The introduction to this catalogue is as follows: "In most lines of manufacturing some of the various forms of power cranes or hoists are now a necessary feature of the equipment employed. Nearly every step in the various processes is so dependent upon the hoisting apparatus as to be at least seriously crippled in case, as sometimes happens, this is temporarily not in operative condition. Cranes are necessarily located in an unfavorable position for cleanliness, or supervision by responsible persons. Their design should, therefore, have special reference to these unfavorable conditions. It may be safely stated that insufficient lubrication, an accumulation of foreign matter in the working parts and rapid destruction of bearings, gear teeth, etc., due to defective alignment of related parts, is responsible for most of the difficulties experienced. We believe that Shepard cranes and hoists are the only ones yet constructed which will maintain all the running parts in corect alignments, and thus keep the pressures and stresses in gear teeth, bearings, brakes, etc., within safe limits, and which have all working parts fully enclosed and a system of lubrication sufficiently simple and positive to insure economical and reliable service with ordinary care. While we manufacture cranes in all sizes ordinarily employed, attention is particularly invited to these machines in the small capacities; they are not, as is usual, improvised and adapted from other standard parts, but each of the small-size machines is a duplication."

Grey Iron Ship Castings are described in Catalogue A., published by The Central Foundry Company, 90 West Street, New York. "The constant changes being made in ship construction and the lack of standardization have created a demand for many and varied ship castings. In this catalogue we have included for your convenience those castings which were used most extensively during the past year. The ample facilities for our foundries have enabled us to meet the most exacting requirements of many of the largest shipbuilders and also to keep pace with the changes made. The utmost satisfaction has been given by our castings in service ranging from the Panama Canal to U. S. Navy barges, and we are fully experienced and equipped to make general castings of every description to your own specifications and blue prints. We desire at all times to co-operate in fulfilling your requirements and we solicit your inquiries. As newly designed castings are made we shall forward full information in the form of pages to be inserted in this catalogue. All weights mentioned herein are subject to variation of 5 percent."

"Aeroil" Thawing Outfits and Torches are described by the Aeroil Burner Company, 400 Main street, Union Hill, N. J., in a bulletin recently issued. One type is described as follows: "This outfit is equipped with two torches so that two men can each operate a torch from the same tank. Recommended for large coal yards, naval, marine, tidewater and railroad coaling stations for quickly opening frozen loading gates. Also used by railroads for thawing out switches at terminals and other important switch points where delays are costly and speed is essential."

W-S-M Dock Cranes at the U. S. Army Supply Base, Boston, Mass., are the subject of Bulletin No. 28, published this month by the Wellman-Seaver-Morgan Company, Cleveland, Ohio. "The Wellman-Seaver-Morgan Company has recently installed four semi-portal bridge type cranes at the U. S. Army Supply Base, Boston, to handle freight to and from ships. The Boston Terminal includes a long eight-story warehouse, separated by a wide roadway from the marginal two-story shed on the wharf alongside which the ships dock. Between the wharf shed and the water is a space 35 feet wide carrying two railroad tracks on which freight cars are run in from main line tracks to deliver or receive freight from the boats. The W-S-M cranes span these tracks and handle the freight between either story of the shed and the boats, and do other general service as well."

IRON STEEL METALS

ARTHUR C. HARVEY CO.

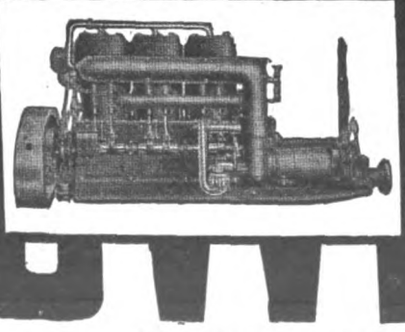
374 Congress Street Boston, Mass.

Tel., Main 7000

BOILER TUBES, RIVETS, PLATES, TANK STEEL, FLOOR PLATES, BARS, SHEETS, STRUCTURAL SHAPES, COLD ROLLED SHAFTING.

WE ARE EQUIPPED TO CUT TO SIZE ANYTHING CARRIED IN STOCK.

POWER



WOLVERINE

"The Motor With the Bore & Stroke"

PLUS FUEL COST REDUCED

From 70 to 80 per cent without sacrificing reliability, flexibility or control. Perfect combustion on kerosene or lowest grade of Coast Distillate.

5 to 200 H. P. — 1 to 6 Cylinders

Ask for Catalog 73.

WOLVERINE MOTOR WORKS, Bridgeport, Conn.

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TACKLE BLOCKS

with a

Safety Factor

of

Five to One!

The **safe working load** of each block with shackle fitting is equal to that of the best quality manila or plow steel wire rope used, **with a safety factor of five to one.**

Scientifically built to stand the strain of strenuous service

PARISH DEPENDABLE Tackle Blocks

mean safety to life and property — ease and smoothness in handling all loads—and enduring economy in operation.

Complete catalogue upon request

Parish Supply & Mfg. Co.

TACKLE BLOCKS CONSTRUCTION TOOLS

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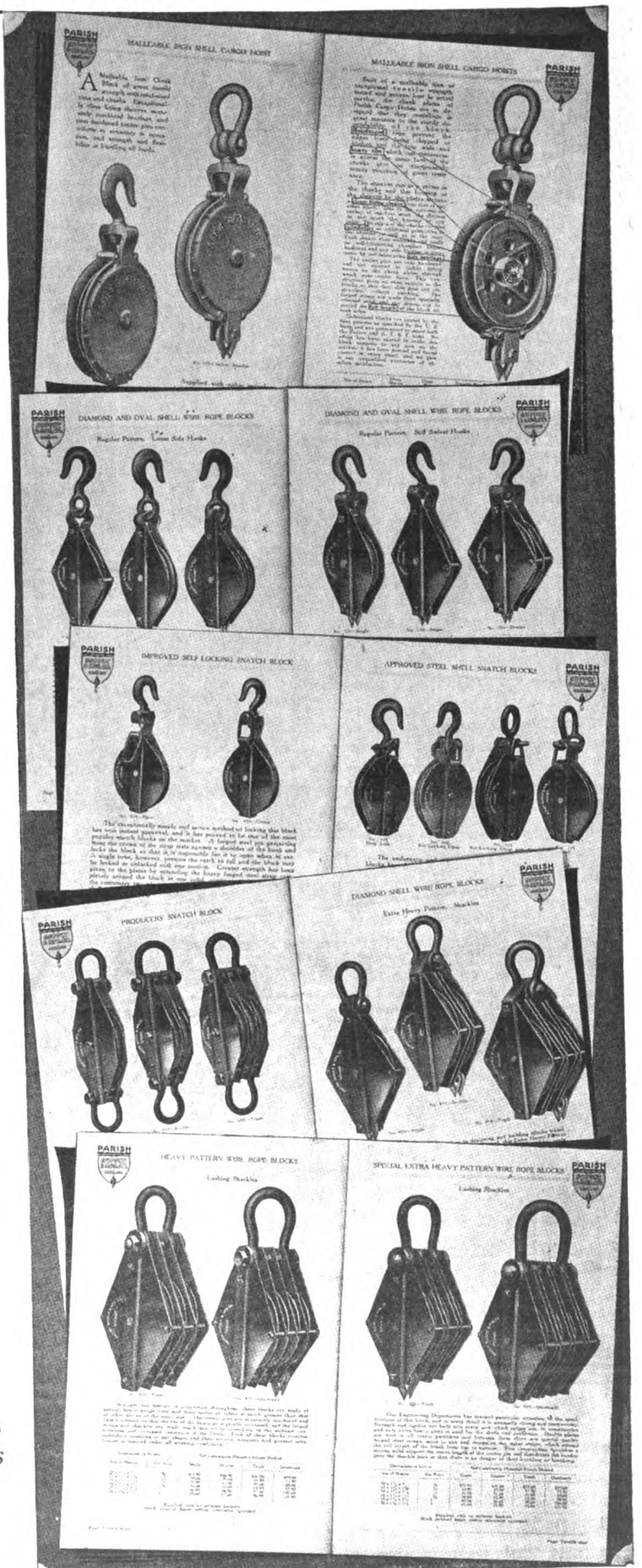
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"The Trackless Train."—The Mercury Manufacturing Company, 4118 South Halsted street, Chicago, Ill., in a booklet recently published, shows many photographs of typical Mercury installations of their industrial haulage system. "A fresh idea broad enough to affect the industrial world is a rare thing, but it stands out from others in direct proportion to its rarity. Watt's steam engine, Whitney's cotton gin, Arkwright's loom, all stand out because they embodied the new idea of freeing human hands from purely mechanical toil. Without presumption it is possible to place Mercury methods in the same category with these revolutionary industrial devices because Mercury frees human hands and releases men from acting as beasts of burden. Mercury methods are an outgrowth of original research into material-handling methods. The Mercury tractor was built to fit the Mercury system of internal transportation, and is, therefore, the means of accomplishing the results attained through 'The Trackless Train.' A quotation from the earlier literature issued by the Mercury Manufacturing Company may help to explain this statement: 'While industrial production was modernized and increased by methods of efficiency, the methods of handling materials within industries were standing still. Equipment for handling materials was occasionally changed, but the method remained the same. After months spent in surveys and in building a system, the tractor-trailer method was evolved, and the equipment was then constructed to fit the method.' This, in brief, is the story of a method which is bringing to industry an improvement hardly less vital than that accomplished by the steam engine. The application to industry is so general, moreover, that its effect is apt to be economic as well as industrial."

"Monel Metal" is the title of a pamphlet published by the Bayonne Casting Company, Bayonne, N. J. The introduction states: "It is truly said that industry never creates a demand that the engineer or metallurgist does not meet. Copper and bronze alloys served most purposes satisfactorily so long as they were only required to withstand alkaline or acid solutions. With the growth of industry new conditions have arisen which call for metals possessing unusual qualities. There is a broad field for an alloy which will withstand acids, high temperatures and the erosive action of hot gases and superheated steam. Monel Metal, highly non-corrodible and with the strength of steel, meets these severe requirements. Monel Metal was first made ten years ago, and the demand for it has grown so rapidly as the knowledge of its characteristics could be spread. In the early stages of development, Monel Metal was supplied only for its high tensile strength and relative immunity to corrosion, while at the present time Monel Metal has many diversified uses. It is the endeavor of The Bayonne Casting Company, in issuing this pamphlet, to direct attention to the physical properties of Monel Metal, the forms in which it is sold and its general uses. It is our further purpose to co-operate in every way with the users of Monel Metal in order to insure its satisfactory application and service. Some of the methods of treatment are not very generally understood, and it is our desire that any consumer wishing technical advice or information will communicate with us."

"What is a Shop?" is the title of a circular published by the engineering and construction firm of Westinghouse, Church, Kerr & Company, Inc., 37 Wall Street, New York. In this circular the company defines the shop as follows: "A shop is primarily a layout of equipment housed in a suitable building—not a ready-made, stock design structure into which equipment has somehow been fitted. In the design and construction of any shop we first make an ideal equipment layout, co-operating with the client in working out routing and handling problems. We then design and build the buildings over and around the equipment, suiting the building to the conditions which the layout imposes. The ideal layout means routing and handling economies and reduced production costs. The buildings are designed and constructed to reduce overhead by being low in first cost and economical to maintain. This W. C. K. method of meeting specific requirements by building over and around a layout is fundamental with us on whatever work we are engaged."

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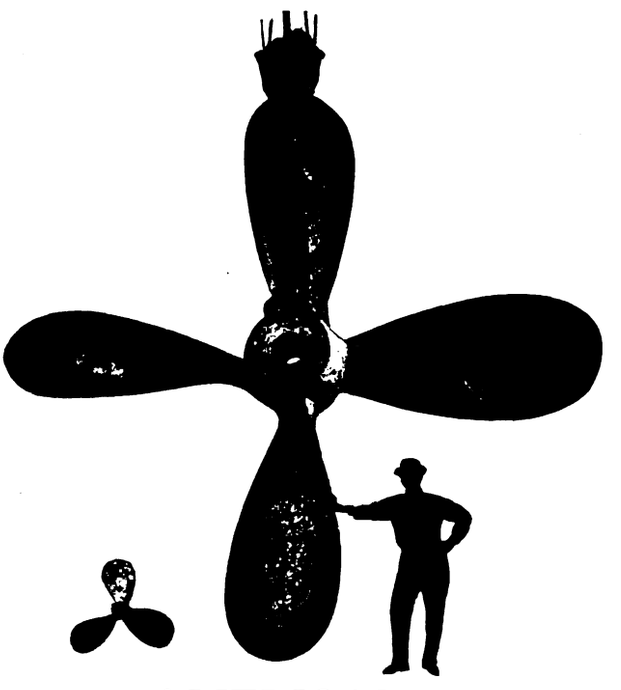
"Thor Super-Power Electric Drills" is the title of a circular published by the Independent Pneumatic Tool Company, 600 West Jackson Boulevard, Chicago, Ill. Thor points of superiority are claimed as follows: "The internal gear drive permits the use of smaller gears and gear case—three teeth in contact instead of one. Small and compact due to the distributed pole motor construction and small gear case. The method of winding the field and armature and the use of ball and roller bearings result in greater power. Extreme durability; interlocking commutator bars; fully taped and insulated coils; large brushes, and perfect automatic brush holders insure long life. Highest efficiency results from the unique motor construction and elimination of all friction. The Thor switch breaks both sides of the line, leaving no current in the drill when idle. It would be impossible to make a switch insuring greater safety. These features are used in Thor electric tools exclusively, and will not be found in any other make. Their compact construction, neat design and high-grade finish are unsurpassed. A Thor electric will drill a hole in metal or wood in one-fifth of the time required by hand. Easy to handle and operate. It will pay for itself in 30 days. No shop can afford to be without one or more of these tools."

You Always Know that the contents of each Linde Oxygen cylinder is up to the Linde standard of purity, according to a statement made in a circular issued by The Linde Air Products Company, 30 East Forty-second street, New York. "By means of careful checking every few minutes during production the purity of Linde Oxygen is kept not only high, but uniformly so. Any production below the Linde standard of purity is discharged into the air. Hence Linde Oxygen is depended upon by thousands of users to produce satisfactory results with the highest economy. The expense of this extreme refinement is spread over such a large volume that no individual user bears a discernible portion of it. Whether for one cylinder or 1,000 we'll fill your orders immediately—there are 65 Linde distributing stations covering the United States."

Marine Lighting and Signaling Apparatus is described in a catalogue published by the Benjamin Electric Manufacturing Company, Chicago, Ill. "For those who go down to the sea in ships and those who send the ships to sea there's a close community of interest in Benjamin marine lighting and signaling apparatus. Trim in appearance. Sturdy in construction. Durable and seaworthy over long periods and severe conditions of service. In every line and detail, made with a fine knowledge of requirements and a high regard for the conditions to be fulfilled in modern ship equipment. Junction boxes, receptacles, connecting blocks, switches, covers and fittings are interchangeable."

Superheat and Lubrication is described in bulletins issued by the Locomotive Superheater Company, 30 Church street, New York. "Valves and cylinders must be lubricated. Lubrication is accomplished either by water in the steam, accompanied by heavy and frequent rod swabbing, or by direct oil delivery. Conditions requiring lubrication are a proof of superheat conditions. There is no moisture in superheated steam; therefore, direct oil lubrication is necessary. If it is not necessary, then superheated steam is not being delivered to the cylinders. Fire-tube superheaters are supplying superheated steam to more than 1,800 ships, all using internal lubrication. Result—12 to 20 percent fuel saving."

The Admiral Anchor is described in Bulletin 104, published by the Admiral Anchor Company, 1417 Sansom street, Philadelphia, Pa. "The Admiral Anchor is simplicity itself—made of five parts. They are assembled by drawing the shank through the opening in the fluke, forcing the fluke pin through the cored hole in the fluke and shank and upsetting its end. The shackle and pin are placed in position, the pin ends upset and the anchor is complete. All parts made of anid open-hearth steel, having a tensile strength of 60,000 to 70,000 pounds per square inch, elastic limit of 45 percent of tensile strength, elongation of 15 to 25 percent and 20 to 30 percent reduction of area."



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Our "Sterling" quality is of unusual fineness, giving Marine Paint that imperviousness so necessary for "the maximum of protection," and has a metallic content of more than 95 per cent., which renders it particularly suitable for use in anti-corrosive paints for steel ship's bottoms.

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"How to Receive a Return from Investments That Shows Each Month" is told in a catalogue just issued by the Chicago Pneumatic Tool Company, 1044 Fisher building, Chicago, Ill. "When each month's power costs are checked against cubic feet of air compressed, 'Chicago Pneumatic' air compressors are shown to have made a substantial return of investment, for this very simple reason: every 'Chicago Pneumatic' is provided with automatic regulation, by means of which the power is varied to correspond with changing load demands. When those demands are light, down goes the power consumption; result—no waste of power, conservation of fuel energy, minimum power cost per cubic feet of air compressed. That saving will be effected the very first month you operate a 'Chicago Pneumatic' and every month thereafter throughout a long service life. Important as this may seem, it is but one of the distinctive features, among them 'Simplate' indestructible flat disc valves, which are resulting in consistently efficient operation at low maintenance cost by 'Chicago Pneumatic' air compressors, in all kinds of service throughout the world."

Hamilton Engines and Machinery are described and illustrated in a catalogue issued by the Hoven, Owens, Rentschler Company, Hamilton, Ohio. "For two years every effort was concentrated on the production of Hamilton marine engines for the United States Shipping Board. New methods of standardized production, disregard of outworn precedent, and a devoted personnel made it possible to put out, complete, 2,800-horsepower marine engines at the undreamed-of rate of four a week. The equipment of the plant where Hamilton engines are made is complete, modern and well balanced; it includes probably the finest and largest outfit of heavy machine tools in the United States. Hamilton engineers are in the front rank—each one a specialist of established reputation in his chosen field. All this means that the name 'Hamilton' stands for the utmost in design, efficiency and endurance."

The Starrett Hack Saw Chart "L" will be sent free to any of our readers upon request. "Follow the chart. Make your hack sawing just as efficient as any other machine tool operation. Choose your blade according to your work. You can't cut cold-rolled and heavy angle iron with the same blade without a waste. Whether you are cutting by power or by hand, big quantities of a comparatively few kinds and shapes of metal or smaller quantities of a lot of different things—there's a Starrett Hack Saw that will meet your needs most efficiently. Get the most out of every box of saws you buy. Use them for the purpose for which they were made."

"Agrippa" Turning Tool Holders and boring tool posts, "Vulcan" forged cutter tool holders and several new assortments of sets of drop-forged wrenches are described in a 160-page catalogue just issued by J. H. Williams & Company, 63 Richards street, Brooklyn, N. Y. This book contains also a description of the drop-forged process in simple, non-technical style, for the benefit of those not conversant with its details.

Albany Grease is described in a bulletin issued by Adam Cook's Sons, Inc., 708 Washington street, New York. "Albany Grease is used by marine engineers on the bearings of all kinds of equipment aboard ship, in shipbuilding plants, repair and drydock yards, regardless of temperature. This is made possible by the wide range of melting points to be had in Albany Grease. If the temperature at the bearing is high, No. X, XX or XXX Albany Grease should be used. For moderate bearing temperature use No. 2 or No. 3 Albany Grease. For cold-running bearings or for outdoor winter service, No. 0 or No. 1 Albany Grease will give satisfactory results. We will be glad to consult with you at any time on your lubricating problems. You are at liberty to draw on our experience of more than fifty years of If you are not using Albany Grease, why not let us send you samples without charge and try it?"

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In all the various grades it is the best for the money—the most serviceable. Pound for pound it will go further and do a better and a more lasting job than any other make. Do not be deceived by cheap imitations; see that the trade mark is on every package.
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Triple Expansion Marine Engine 18" x 32" x 54"—42" stroke. Has been in service fifteen lake seasons in a wooden steamer of 3000 tons capacity. Has been thoroughly overhauled and is in A-1 condition. Shipping weight approximately 70 tons.

Windlass, 8 x 10 of Providence manufacture, suitable for 1¾" stud link chain. Arranged for capstan drive. In first class condition.

Both subject to inspection. Immediate delivery.

McDougall-Duluth Company
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De Laval Steam Turbines with double reduction gears are described in Publication No. 46, just issued by the De Laval Steam Turbine Company, Trenton, N. J. "The following sister ships, *Piqua, Waukesha, Middlebury, Lynchburg, Marshal, Aurora,* each of 4,500 tons, are all equipped with De Laval 1,500-horsepower turbines, with double reduction gears designed for a propeller speed of 90 revolutions per minute. All of these boats exceeded their speed requirements on trial trips by a comfortable margin. The first vessel was placed in commission about a year and a half ago, and the last six months ago, and all the propelling units have proven entirely satisfactory, the gears being exceedingly quiet and the turbines economical of steam. Quietly operating gears mean correct design, correct cutting and correct support. Noise in gears is also a serious fault from the operator's standpoint, as noisy gears cause great inconvenience to the operating crews and make it very difficult to detect troubles that may occur in various parts of the engine room with auxiliaries, which would be instantly noted if the gears operated quietly. The great simplicity of the geared turbine drive likewise reduces expense for attendance. There are no complicated valve gears and no packing, and the oiling system is simple and automatic. No oil is introduced into the exhaust, thus reducing the attention required by condensers and boilers. State the type of vessel that you are building or contemplating, as we can probably refer you to similar vessels operating with De Laval geared turbines. We shall also be glad to supply data concerning weights, space requirements, efficiencies, etc."

"Marine Boiler Logic" is the title of a booklet issued by the Heine Safety Boiler Company, 5322 Marcus avenue, St. Louis, Mo. "As Admiral of the Fleet and later as the First Sea Lord of the British Admiralty, Sir John Fisher worked constantly to improve British naval construction. In the London *Times,* recently, he said, 'Was I wrong about the water-tube boiler when the whole expert world was against me?' Sir John was right in insisting upon water-tube boilers, as shown by the service they have given. Water-tube boilers were a vital factor in the British fighting ships that played an all-important part in the war. Reliability and efficiency must characterize the power plants of modern ships. These qualities are required for the successful operation of American vessels under conditions of peace. Heine marine boilers of proved reliability and efficiency are now available for ships carrying American merchandise and passengers. Their construction is explained in the new treatise, 'Marine Boiler Logic,' which also gives the fundamentals of marine power plant design. Send for your copy."

Marine and Stationary Steam Specialties are described in Catalogue 25, just issued by the McAlear Manufacturing Company, 1901 South Western avenue, Chicago, Ill. This company manufactures a large line of pressure reducing valves, steam traps, back pressure valves, grease extractors, pump governors, vacuum pumps, governors, automatic relief valves, chronometer valves, excess pressure pumps and other marine specialties.

The Revolvator is described in Bulletin 50, published by the New York Revolving Portable Elevator Company, Jersey City, N. J. "The Revolvator is a portable elevator or tiering machine. It consists of two uprights, an elevating platform and a revolving base, which can swing around on its own center like a turntable. This revolving base, which is fully protected by patents, is a distinct improvement over the old type non-revolving base machine, and makes the Revolvator 100 percent more efficient than the old-style tiering machine. A box or bale is placed on the platform when down, and by means of a crank and gears the platform is raised to any level desired and swung around on its own center, convenient for unloading. Rollers on the platform permit one man to slide the load from the Revolvator directly into the space where it is to be stored."

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will raise your superheat 50 degrees

Perhaps half the cost of generating power is for fuel to produce steam, therefore if steam is the all important product as the first step in the production of power, is it not proper that some concern should be shown for the kind of steam produced?

Impure feed waters are the prime causes of wet and dirty steam, yet such waters are the only kinds available to most boilers and their use is required. Chemical treatment merely lessens scale deposition and generally increases the moisture and dirt contents in the steam.

No type of boiler can always turn out dry steam or clean steam and the so called "dry pipes" can help but little toward that end.

Tracy Steam Purifiers in the steam drums prevent the passage of water or dirt through them, therefore the steam will be absolutely clean and 100% dry, by calorimeter test.

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Rectangular Heavy Metal Storage Tanks for storage of lubricating, crude and paint oils, light paint, cutting oils and other non-volatile liquids are described in Bulletin 89, just issued by the Wayne Oil Tank & Pump Company, 589 Canal street, Fort Wayne, Ind. "The methods employed in the construction of heavy metal storage tanks have undergone considerable change in the last few years. This is especially true with the square or rectangular tanks. Breaking or bending the corners to exact alignment, shearing and punching so that in assembling the rivet holes come true, allowing the use of rivets of uniform diameter, internal bracing of the larger-sized tanks, mechanically figure so as to distribute the strain evenly over the entire surface, preventing bulging when the tanks are filled with liquid—is under the direct supervision of a competent engineer."

"Midwest Marine Power" is the title of a bulletin issued by the Midwest Engine Company, Indianapolis, Ind. "Those interested in the creation of marine power that is dependable, as well as economical, will do well to note the unusual facility of inspection and repair afforded by the equipment illustrated herewith. This is the four-cylinder Midwest Diesel marine oil engine, clutch type. It is also made in two- and three-cylinder sizes, and in the six-cylinder direct reversing type. The open crankcase makes it possible to remove pistons and piston rings without dismounting the cylinder heads or connecting rods. Simple, positive control for moving ahead or astern guarantees extreme flexibility of operation. Highest known efficiency is assured by the use of low-cost crude and fuel oils."

"A Problem and Its Solution" is the title of a booklet published by the Du Pont Chemical Company, Inc., Wilmington, Del. "The Du Pont war plants have shut down. They were fully equipped factories with every mechanical device giving satisfactory service. Their machinery, equipment and material are now offered for sale. Many items on the list can be used in your manufacturing or construction operations. Much of this apparatus is better than new. Careful operation has taken all the 'kinks' out of it. All of it has been tried and tested in actual service and found to be dependable. The cost of repairing a piece of worn-out equipment will pay for a Du Pont machine in good running order. The Du Pont Chemical Company now offers this peace surplus equipment at most alluring prices and for immediate delivery. Of course, it is impossible to give a complete listing in these pages. Our offerings are so varied that we suggest to the reader: 'If you don't see what you want ask for it.' It is highly probable that we can fill your requirements, but you must act quickly or you will miss some rare purchasing opportunities."

"The World's Standard Air Tools" is the title of a folder published by the Independent Pneumatic Tool Company, 600 West Jackson Boulevard, Chicago, Ill. The superior points of Thor tools are stated to be as follows: "The only pneumatic drills made in this country having Corliss valves patterned after the Corliss engine; the only pneumatic drills made with roller bearings on each end of the crankshaft, reducing friction to a minimum; the only pneumatic drills having one-piece pressed vanadium steel connecting rods and pistons. Also equipped with removable crank chamber plate, allowing easy access to inside working parts. A telescopic screw-feed gives longer range in drilling. The only long stroke riveting hammer having a one-piece barrel and handle. Can't come loose."

The Ingersoll-Rand Company, 11 Broadway, New York, has issued the following bulletins describing its pneumatic tools: Form No. 8707—This is a 40-page, 6 x 9-inch bulletin on 'Little David' pneumatic drills, grinders and saws. Catalogue illustrates the various sizes and models of the different machines and contains detailed description concerning the particular tool to use for a given purpose. The descriptive matter is supplemented with a number of tables giving air consumption of the various tools, etc. Form No. 945—"'Tis a Good Investment' is a subject of an 8½ x 11-inch form illustrating ER and FR compressors for small machine shops, power houses, garages, etc. Form No. 954—8½ x 11-inch sheet descriptive of the 'Air Lift Method of Pumping.'"

Marine Electric Fixtures are described in Catalogue 15, published by the Seidler-Miner Company, Detroit, Mich. "S-M electrical devices have become standard for marine work because of the excellent service which they give, combined with their economy. The design of the new line, shown herewith, is such that a minimum number of parts is required to make up a modern installation. Attention is called to the fact that prevailing W. T. Globe Fixtures consist particularly of two elements—the Globe holder and the body. The latter performs the function of an outlet box, which necessitates the use of a very large number of combinations of body and holder, to take care of the different requirements imposed on the body, as an outlet box. The S-M universal box, as described in this booklet, eliminates this disadvantage, requiring very few parts. It is designed to accommodate the standard wiring devices, always easily obtainable on the open market, and thus obviates the need of carrying a large and miscellaneous assortment of parts. The design of these appliances does not deviate from existing standards, but merely adds desirable features and decreases the assortment of parts. Many of these new ideas are protected by patents granted and pending."

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Stop, Check and Emergency Valves are described in revised Catalogue 8B, just published by the Schutte & Koerting Company, 1158 Thompson street, Philadelphia, Pa. A copy will be sent free to any of our readers upon request.

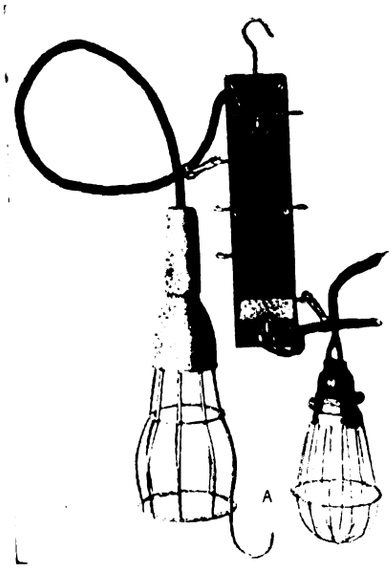
Condensers, Pumps, Cooling Towers, etc.—Revised and enlarged Bulletin No. 112-B, entitled "Condensers, Pumps, Cooling Towers, Etc.," has just been published by the Wheeler Condenser & Engineering Company, Carteret, N. J. This bulletin illustrates the latest developments in condenser practice. It shows a surface condenser containing 50,000 square feet of surface. Sixteen condensers of approximately this size are now under construction. These will contain approximately 1,000 miles of Crescent Brand tubing drawn in the large Wheeler tube mill. The bulletin shows photographs of a number of actual installations of surface condensers. It illustrates and describes surface condensers, jet condensers, barometric condensers, the Wheeler-Edwards air pump, the Wheeler rotative dry vacuum pump, the Wheeler turbo-air pump, the patented Wheeler steam jet air pump, Wheeler centrifugal pumps for all services, jet condensers, barometric condensers, natural and forced draft cooling towers, feed-water heaters and Wheeler evaporators and dryers.

"Rugged Radio" is the title of a circular published by the Kilbourne & Clark Manufacturing Company, Seattle, Wash. "The popularity of K-C Radio is traceable solely to no one feature, but to many—each of great value. First, it is apparatus of unusual ruggedness—it is built to stand service. Second, it is compact—no more space than the corner of the average stateroom is required to accommodate it. Third, it is easy to set up—in a pinch, a set can be made ready to operate in a day. Fourth, the range is long—and this is a feature worth no small degree of consideration. For numerous ships are spending thousands of dollars needlessly each year because they are equipped with apparatus of inadequate range. The span for K-C Radio, two-kilowatt size, under normal conditions, is 2,000 miles with a 6,000-mile range under favorable circumstances. Fifth, K-C Radio is sold outright. This is the apparatus that made possible the general use of Radio. There are no tolls—no costly royalties—no annoyances. K-C Radio becomes the purchaser's property to use as much or little as desired. Sixth, K-C Radio is manufactured, backed and guaranteed by the largest radio manufacturer in the world—Kilbourne & Clark. Further particulars and catalogue on request."

"Rope That Satisfies" is the title of a pamphlet issued by the Plymouth Cordage Company, North Plymouth, Mass. "The last ninety-five years have wrought great changes in the cordage industry. Modern machines and the factory system have made possible a greater output and a better product than were even dreamed of in 1824. During these years manila fiber has established itself as the undisputed king of all rope-making materials. Uses for rope have greatly increased and a need has grown up for many different types of rope for many different tasks. People have come to appreciate that there are such things as good value and poor value in rope and have learned—often through bitter experience—that it pays in every way to buy the best quality. * * * All Plymouth Manila products are pure manila products in every sense of the word—unadulterated, unloaded, unmixed. The same purity of manufacture characterizes Plymouth Sisal products and all other goods that we make."

The White System of Burning Fuel Oil Mechanically is described in literature published by the White Fuel Oil Engineering Corporation, 742 East Twelfth street, New York. The company has made 660 installations on vessels of leading steamship companies, United States Shipping Board and United States Navy, including many of the largest steamships in the world.

"LITEHOLD" Portable Strip and Plugs



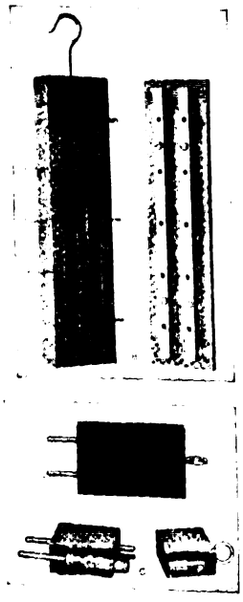
For temporarily lighting Hulls of Ships under construction

Illustration A.—Strip and 2 Plugs showing different type guards. Note supporting hook, also snap hook strain relief for plugs.

"B" carbolineum treated maple base with fibre top and brass connections for 5 plugs, Base 10½ in. long, 2½ in. wide, 1-13/16 in. thick.

"C" hard rubber plug, 1 in. thick, 2 in. wide, 3⅛ in. long, with brass prong contacts and midget enclosed fuse. Fuses 2 to 15 amp. as desired.

OKONITE hard service cord recommended for use with above.



NOVELTY ELECTRIC COMPANY

Manufacturers and Distributors Electrical Supplies

50-52-54 North Fourth Street Philadelphia, Pa.

Agents for: **Okonite—Wires—Cables—Tapes Holtzer-Cabot—Motors—Generators, Etc.**

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HELP AND SITUATION AND FOR SALE

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Advertisements will be inserted under this heading at the rate of 4 cents per word for the first insertion. For each subsequent consecutive insertion the charge will be 1 cent per word. But no advertisement will be inserted for less than 75 cents. Replies can be sent to our care if desired, and they will be forwarded without additional charge.

Wanted—Steel Tug, 100 to 115 feet long, 500 to 700 horsepower. New boat preferred. Address, giving full particulars, *P. O. Box* 477, Charleston, S. C.

College Graduate, scientific course, first-class traded machinist, experienced in marine engine construction, coal and oil firing; splendid health and physique; executive experience; success with labor; 34 years of age; married. Permanent connection desired, $55 week. Address Box 209, care of MARINE ENGINEERING.

Wanted—A High-Grade Superintendent for structural and plate shop, capacity one thousand tons per month. No one need apply who is not a first-class, well educated, thoroughly experienced man, with good references. Apply *Box* 807, care of MARINE ENGINEERING.

Marine Engineer—Wanted for an important and permanent position a high-grade marine engineer to take full charge of work. Excellent opportunity; large company; location New York. Address *Box* 28, care of MARINE ENGINEERING.

Wanted—Marine Auxiliary Draftsman, capable of designing steering engines. Permanent position. Give age, experience, education and salary expected. *The Main Electric Company,* 35 Commercial street, Portland, Me.

Wanted—Technical Graduate familiar with Marine Engineering specifications, first-class marine engine, electrical and pipe draftsmen. Permanent positions for right men in shipyard near New York City. Address *Graduate,* care of MARINE ENGINEERING.

For Sale—One 13-inch General Electric type P. C. thirteen, twenty-ampere, one hundred fifteen-volt direct-current searchlight, complete with rheostat, overhauled and in A-1 condition. Three 67-foot and three 75-foot cargo booms in good condition. Address *Freeport Sulphur Company,* Freeport, Tex.

Oil Engine Drawings for sale in full sets of standard shop working drawings. For 5,000- and 9,000-ton steamers, four-cylinder, 24 by 36, 1,450 horsepower, by 96 sheets, $1,200; for tugs, four-cylinder, 18 by 27, $1,000, and four-cylinder, 16 by 24, $900. For yachts or as auxiliaries, steel column crosshead type, 10 by 12, $900; 6 by 8, $600; 4 by 5 trunk piston, $300. Address *Fuel Oil,* care of MARINE ENGINEERING.

A Capable Ship Draftsman, with twelve years' experience in marine work, desires position as chief hull draftsman or hull inspector with a reliable shipbuilding company or steamship company. Must be permanent. Address *Box* 12, care of MARINE ENGINEERING.

Steamer Hull—iron, 328 feet long, 46 feet beam, 14 feet, 6 inches depth. *James Shewan & Son, Inc.,* foot of 27th street, Brooklyn, N. Y.

Good Proposition for Investors in the incorporation and development of patents in Marine Salvage. Write for further detail. Address *Box* 18, care of MARINE ENGINEERING.

Wanted at Once, Twenty Experienced Marine Draftsmen by a large shipbuilding corporation with a large amount of work on hand. Must have had marine engineering experience which will qualify for high-grade work. Send application, stating full experience and salary expected, to *Box* 55, care of MARINE ENGINEERING.

Wanted—By North Atlantic Shipyard, Draftsmen familiar with bilge and sanitary piping, steam heat and deck steam lines. Apply, stating experience and rate expected, *Box A-7,* care of MARINE ENGINEERING.

Naval Architect and Marine Engineer open for an engagement, wide experience abroad and in this country on all classes of marine construction. Address *Architect,* care of MARINE ENGINEERING.

Wanted—Well experienced and reliable draftsmen for Diesel engine work. Men with several years' experience on marine Diesels preferred. Give full account of previous experience, stating salary expected and age. Address *Box* 653, care of MARINE ENGINEERING.

Wanted—By a Delaware River shipyard, first-class man for engineering and estimating work. Man with technical training and shop and sea experience preferred. Addres *Delaware,* care of MARINE ENGINEERING.

Mechanical Engineer—Graduate of two colleges, has had full charge of materials in large Eastern shipyard, recently closed, wants position with engineering or contracting company. Can handle men. Will go anywhere. Age 29. Salary, $70 per week to start. *J. K. Smith,* West Park, N. Y.

Wanted—Several first-class hull and engine draftsmen. Good wages for good men, those with experience on Isherwood System preferred. Address reply to *Naval Architect, National Shipbuilding Corporation,* Three Rivers, Quebec, Canada.

Mechanical Engineer, during the last decade in charge of research and developing work on solid injection and Diesel oil engines, air compressors, etc., desires change. Leading and responsible position wanted as designing engineer. Excellent references. Address *Mechanical Engineer,* care of MARINE ENGINEERING.

To Represent United States Firms in Germany.—A leading Engineer in Europe, who superintended construction of largest vessels of the world, is in excellent position through acquaintance in highest steamship circles, shipbuilding and machine construction companies in Germany to represent American manufacturers of all kinds of machinery, tools and mill supplies, etc., and is willing to make arrangements as will satisfy American firms looking for representation. Write, giving full details, to *Chief Engineer L. Christlieb,* Schulweg 48, Hamburg 19, Germany.

"Spraco Painting Equipment" is the title of a bulletin published by the Spray Engineering Company, 93 Federal street, Boston, Mass. "Spraco Painting Equipment overcomes labor shortage. One man of average intelligence can do the work of 5 to 10 experienced painters with Spraco paint gun. And not only is there an appreciable saving in material but the job is done better, for the Spraco paint gun gets into every crevice and applies a uniform coat of paint. An average-sized job pays for the equipment. Send to-day for bulletin."

FOR SALE

PLATE BENDING ROLLS

Distance Between Housings: 20'-6"
Diameter of Rolls—Lower 20", Upper 23"
Capacity—Plate 20'-0" x 1"

ONE MOTOR

35 H. P—720 R. P. M.—42 Amperes.
440 Volts—3 Phase—25 Cycle.

UNION SHIPBUILDING CO.
BALTIMORE, MD.

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Where "85% Magnesia" Saves Coal

THOSE brilliant lights of the Plaza Hotel, gleaming aloft over Central Park, tell nightly a story of *coal saving* by "85% Magnesia." Heating, Lighting and Power depend upon "85% Magnesia" pipe and boiler coverings.

Without such steam protection the coal-wastage would be enormous, prohibitive.

All over America this matchless Coal-Saver protects the steam pipes and boilers of the largest hotels, department stores, skyscrapers, public buildings, railway terminals, and the Power Plants where the closest coal-economy is studied.

The coal-saving necessary in the biggest heating and power plants is imperative in every plant—yours, for instance.

Every few months the coal-saving wrought by "85% Magnesia" pays the entire cost of its installation.

The Whole Story

Write us for new Treatise, "Defend Your Steam", which describes the triumphs, the fields and uses of "85% Magnesia."

Specification for Engineers

The Mellon Institute of Industrial Research of Pittsburgh University, after three years spent in developing the principles of Coal-Saving by Insulation, has compiled a Standard *Specification* for the scientific use of "85% Magnesia" pipe and boiler coverings.

Write to the Secretary of the Association for a copy.

MAGNESIA ASSOCIATION *of* AMERICA, 721 Bulletin Building, Philadelphia, Penna.

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Pollak Steel Company Purchases Marion Rolling Mill

The Pollak Steel Company, Cincinnati, Ohio, announces the purchase, and the Interstate Iron & Steel Company announces the sale of its rolling mill property at Marion, Ohio, to the Pollak Steel Company. The sale comprises the land, buildings and machinery, all raw and finished materials and supplies located at Marion, and also the sales and purchase contracts of the Marion Works and the good will of the Interstate Iron & Steel Company.

The Pollak Steel Company was given possession of the Marion properties on December 1. The Pollak Steel Company states that the present organization of the Marion Works, of which O. O. Bell is works manager, and Mr. Verner works auditor, will be retained and that operations will continue the same as heretofore.

The Pollak Steel Company contemplates numerous improvements to the present Marion Works which is in line with its well defined progressive policy already demonstrated by its many improvements at its Cincinnati Works and the addition to its Chicago Works of a large drop forge plant for the manufacture of all lines of drop forgings and forge machine products.

The acquisition of this new plant gives to the Pollak Steel Company a wide variety of steel products, the Cincinnati Works specializing in the heavier forgings for railroad, marine and industrial service, the Chicago Plant all manner of drop forgings as well as the heavier forgings, and the Marion Plant producing all manner of rolled products.

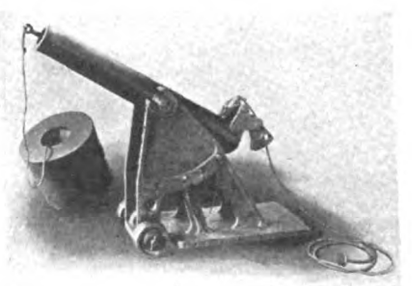
The Pollak Steel Company is a closed corporation, with Emil Pollak, president; Maurice E. Pollak, vice-president, and Julian A. Pollak, secretary, all located at the general offices, Cincinnati, Ohio. Bernard E. Pollak is treasurer and general manager, with offices at 120 Broadway, New York City.

The general sales and foreign offices, of which D. E. Sawyer is general sales manager, are also located in New York City, with district sales offices in all the principal cities in the United States.

Life Saving Gun Receives Endorsement of United States Steamboat-Inspection Board

In a series of recent tests made for the United States Steamboat-Inspection Board, the new G-O gun, produced by the General Ordnance Company, New York, for throwing life lines, fully met the requirements established by the board.

In one of the tests the cartridge case was immersed in water and then put into the gun and fired. In another the barrel of the gun was filled with water, the cartridge inserted and fired through the water, indicating that moisture does not damage the cartridge or mechanism in any way. A one-piece ammunition powder charge and projectile is used which eliminates the danger of moisture getting into the powder.



New G. O. Life Saving Gun

The gun is made in two parts: the cartridge and the barrel are so constructed that they can be moved from one part of a boat to another. The barrel can be carried by one man. Teeth on the bottom of the gun carriage hold it firmly in place during firing.

It is claimed that accurate shooting is possible up to a distance of 1,700 feet.

American Glue Company

BUSINESS ESTABLISHED BY ELIJAH UPTON IN 1808

Manufacturers of

UNION *Abrasive Paper and Cloth*

AMMUNITE discs and belts for grinding and polishing hard metals. UNION Garnet Paper and Cloth for finishing hard wood floors and decks. NEW ENGLAND FLINT for general wood-working uses. UNION Emery Cloth for metals.

Hard, sharp, evenly coated crystals, backed by the proper weight of tough rope paper, or the best woven Drills, Jeans, and Duck Cloth. Set hard and fast by the finest grade of glue we make. When we say "cut faster" and "last longer" there is something behind our boast. Let us prove it to you.

UNION Hide and Bone Glues for All Purposes

UNION Marine Glue for paying decks of vessels and similar marine purposes. Good in Arctics or Tropics. An excellent filler for floors.

Write Us Today For Samples

AMERICAN GLUE COMPANY

121 Beverly Street, Boston, Mass.

BRANCH STORES

New York Philadelphia Chicago St. Louis San Francisco

FACTORIES FROM COAST TO COAST

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SAFETY AT SEA

Lundin Lifeboats constantly prove their worth in disasters at sea, where unusual seaworthiness, reserve buoyancy, and protection of occupants make them a real refuge in time of need.

For many years we have specialized in the manufacture of

LUNDIN DECKED LIFEBOATS **WELIN QUADRANT DAVITS**

and many other highest grade

LIFE SAVING APPLIANCES

We also manufacture all Balsa products. Encysted Balsa is the only insulating material having structural strength. It is used most successfully for ships' ice boxes, cold rooms, and all manner of insulated compartments of ships.

American Balsa Company, Inc.

WELIN MARINE DEPARTMENT

50 East 42nd Street **New York, N. Y.**

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TRADE PUBLICATIONS

"The Oil Engine of the Future" is the title of a circular published by the Ingersoll-Rand Company, 11 Broadway, New York. "There is no doubt that the complexity of construction of the Diesel engine, and the intimate acquaintance necessary on the part of the engineer with each engine for its proper operation, has in the past been one of the reasons why more ships were not equipped with them. The methods of starting and reversing were not only complicated, involving shifting the cams, and differing on each make of engine, but frequently troublesome. Cylinder heads required special supervision by some one familiar with their construction in order to prevent abnormal temperature stresses and insure proper supply of fuel. The two- or three-stage air compressor necessary to supply air at 1,000 pounds pressure for fuel injection presented additional complications, while at the same time using at least 10 percent of the power developed by the engine. The Ingersoll-Rand oil engine presents the solution of this problem. It is very simple to operate and is started or reversed without shifting a single cam. It requires no special supervision of the cylinder head and valves, as it employs low compression pressures, and has, therefore, no extraordinary cooling problem. It employs direct injection of fuel, eliminating the problems connected with two or three-stage air compressors, and the possibility of air-bound fuel pipes, but has no hot bulb or cap. The P-R is as simple and dependable and as easy to operate and care for as the gas engine. Its fuel economy is as high as the Diesel, and it will burn very heavy fuel oils. The company is prepared to accept orders for early delivery of direct reversible marine engines from 200- to 600-shaft horsepower."

"How to Reduce the High Cost of Production" is the title of a leaflet published by the Pratt & Cady Company, Inc., Hartford, Conn. We quote as follows: "You are invited to attend a movement to perpetuate the good work started by the United States Government, during the war, to reduce the high cost of production by standardizing manufactures. It is to the advantage of manufacturers to do all possible to discourage the use of special sizes or designs which, in most cases, vary only slightly from the standard goods shown in their catalogues. For it costs more money to manufacture 'specials,' upsets manufacturing schedules, retards production and requires the time of labor which, in these days, is scarce and high priced. So why not urge your customers to use your Standard goods when they order Specials? And why not also follow the same course when you order goods? In our plant we are working hard to produce enough Standard goods to supply the big demand. But, to operate economically and with sufficient speed to supply the wants of our customers, Standard materials must be put through the factory on a quantity basis."

"Wire Rope" is the title of a bulletin issued by the Bourne-Fuller Company, Cleveland, Ohio. "If we did not know that Williamsport Wire Rope is equal or superior in quality to any wire cable ever produced, we would certainly not care to have our name identified with its distribution. If we did not believe that we can make good on our constant assertion that 'Bourne-Fuller Service is Efficient' we would not be wiling to direct your attention to it. The fact is that in point of uniform quality, conformity to every standard specification bearing on the manufacture of wire rope, The Williamsport Wire Rope Company, backed by the most modern wire drawing plant in America, delivers a product which has constantly made good wherever used. You cannot go wrong in using this rope The Bourne-Fuller Company is unusually well placed to serve your requirements in wire rope. In addition to prompt shipments from one of the largest factories in the country, we offer you for immediate shipment very large stocks of this product, located in various cities. Our most complete stocks are in Cleveland and Cincinnati, where we carry all sizes, all constructions, in all standard grades."

IRON STEEL METALS

ARTHUR C. HARVEY CO.

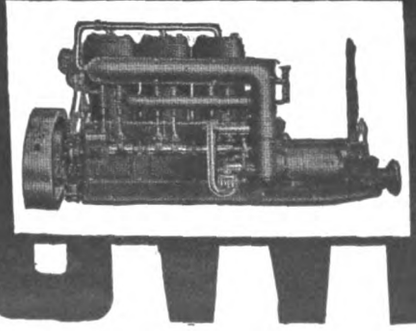
374 Congress Street Boston, Mass.

Tel., Main 7000

BOILER TUBES, RIVETS, PLATES, TANK STEEL, FLOOR PLATES, BARS, SHEETS, STRUCTURAL SHAPES, COLD ROLLED SHAFTING.

WE ARE EQUIPPED TO CUT TO SIZE ANYTHING CARRIED IN STOCK.

POWER



WOLVERINE
"The Motor With the Bore & Stroke"

PLUS FUEL COST REDUCED

From 70 to 80 per cent without sacrificing reliability, flexibility or control. Perfect combustion on kerosene or lowest grade of Coast Distillate.

5 to 200 H. P. — 1 to 6 Cylinders

Ask for Catalog 73.

WOLVERINE MOTOR WORKS, Bridgeport, Conn.

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PARISH SUPPLY & MFG. CO. CHICAGO

Specify Parish Blocks

for strength

Each block is designed and built for a definite working load, and for a rope of a specific size. The working load of the block is equal to the working load of the rope. The tensile strength or breaking strain of the block is sufficient to provide an ample margin of safety.

for service

Sheaves carefully trued and machined to .002 of an inch increase the life of the rope. The perfectly fitted bearings prevent excessive side play and greatly reduce the rope strain caused by swaying loads. The rope fits accurately into the sheave grooves; the strands are not forced apart or confined too closely and there are no rough surfaces to cause excessive friction.

for satisfaction

Built of the best material in every detail, the unusually accurate machine work has reduced bearing wear to minimum. Parish Blocks consequently give more satisfactory service for a longer period without attention and without replacement.

Charts and Catalogue Upon Request.

Parish Supply & Mfg. Co.
2856 Quinn Street
CHICAGO

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"Westinghouse Underfeed Stoker" is the title of a 36-page, 8½- by 11-inch booklet, with an attractive three-color cover, just issued by the Westinghouse Electric & Manufacturing Company, of East Pittsburgh, Pa. Under the head of "Details of Construction" it gives a comprehensive description of the leading features of design contributing to the efficiency and reliability of operation. The interconnection of grates and tuyeres and the arrangement of brackets, gears and fuel deflecting plates, are clearly described. Taking up the principles of operation, the circular explains, by use of sectional cuts and charts, the distinctive features of the Westinghouse zone system of air distribution. The subjects of "Efficiency" and "Capacity" are taken up together with "Flexibility." Curves setting forth extensive performance data relative to these subjects and others are used to amplify the text. Under the subjects of "The 'Coal-Saving' Problem" and "Fuel-Burning Equipment of Modern Power Stations," an interesting and instructive array of information is given for the benefit of those who have the operation of stokers in charge. A large list of representative installations making use of these stokers is another prominent feature. It is plentifully illustrated.

"Drill Salvage—The First Aid to Rising Shop Costs," is the title of a circular published by the Rich Tool Company, Railway Exchange, Chicago, Ill. "The mortality of shop tools is a subject to which you have given much thought. Drills and reamers will wear and break and accidents will happen. Perfectly good drills will break off at the shank or a perfectly good shank must be discarded when the drill is damaged or worn out. It is to meet these ever-present conditions that we have designed the Rich No. 22 two-piece interchangeable drill, which makes it possible to conveniently and economically reclaim your broken shank drills and thus place your shop costs on a lower level. The blade of the Rich No. 22, in common with all Rich products, is forged from the bar at the proper temperature, and is fitted with a straight thread and a taper which engage a similar thread and taper in the shank. The thread does not seat. The taper takes the thrust. This shank can be furnished standard or oversize, making it possible to use drills to which you can adapt either standard or oversize shanks as desired. Positive alignment is assured. If the blade wears out or is accidentally broken, you do not have to buy a whole tool. The blades or shanks may be obtained separately. Your broken shank drills can be fitted to these sockets. Rich products consist of taper and straight shank drills and reamers; track and bonding bits, countersinks and rivet sets in a wide range of sizes and styles, and as they are built to give maximum and uniform results, they are adopted as Standards in shop equipment of their character."

Zinc Plates for use in the shipbuilding industry are described by the New Jersey Zinc Company, 160 Front street, New York, in a circular just published. "Our numerous mines yield such a comprehensive variety of zinc ores that we are able to exactly meet every zinc requirement. Our rolling mills at Palmerton, Pa., are now prepared to furnish zinc ship plates and boiler plates of any desired dimensions and thicknesses and of just the right quality to best serve their purpose. This organization, with its extensive resources and its seventy years of experience in the development and production of zinc products, has unusual advantages in meeting the needs of the ship building industry."

"How Some Shipowners Increase Their Profits." This is the title of a 48-page book illustrated in colors and published by the Diamond Power Specialty Company, 58 First street, Detroit, Mich. This book is written particularly for owners, managers and superintending engineers as well as for vessel chiefs. It deals first with the relation of boiler efficiency to coal consumption and to steaming radius. It then discusses the relation of soot to boiler efficiency, and after an interesting review of the soot problem discusses Diamond soot blowers for all types of boilers in considerable detail. Copies may be had on application to the company in Detroit or by addressing F. W. Leahy, Marine Manager, 32 Broadway, Room 1611, New York City.

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INTERNATIONAL
COMPOSITIONS FOR IRON AND STEEL VESSELS' BOTTOMS
In use and in stock at all ports of the world. Over 18,000,000 gross tons of shipping coated annually
Proprietors of INTERNATIONAL COMPOSITION, ANTICORROSIVE, and ANTIFOULING
INTERNATIONAL COMPOSITIONS CO. Offices, Welles Bldg., 18 Broadway, N. Y.

VALK & MURDOCH COMPANY
CHARLESTON, S. C.
Builders of Marine Boilers, Scows and Lighters

8,000-Ton Floating Drydock	1,500-Ton Marine Ry.	500-Ton Marine Ry.
Length on Blocks 440′	Length on Blocks 220′	Length on Blocks 100′
Depth over sill 22′	Depth over Blocks 14′	Depth over Blocks 7′

Marine Repairs a Specialty

STRATFORD SPECIAL NO. 1 MARINE OAKUM
receives the highest classification of the American Bureau of Shipping and Lloyd's Register of Shipping. It meets the requirements of all of the United States Government specifications. For years we have guaranteed the quality of each bale to be standard of excellence and returnable at our expense if otherwise. More of this grade Oakum has been used by the United States Government and its contractors than all other makes combined, yet, not a single bale has been condemned or rejected, whereas it has replaced the condemned Oakum of almost every other make. Our experience, quality and service are worth more to you than we ask.
GEORGE STRATFORD OAKUM COMPANY Jersey City, N. J.

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A Band Ship Saw is the subject of Bulletin N-19, issued by the J. A. Fay-Egan Company, Cincinnati, Ohio. "Foresightedness and ability to mobilize its resources quickly enabled the Fay-Egan organization to perform a great public service. For many years there had been absolutely no demand for machines for building wooden ships. The old models had become obsolete and had been discontinued. In this class of work a heavy bevel cutting band saw forms the most important item of equipment; in fact, in the smaller yards, generally, it is the only machine used. With the first signs of a shortage of ocean tonnage our engineering department, foreseeing a shortage of steel and a resulting revival of wooden hull ships, started to develop a line of machines adapted for working timbers of hitherto unheard-of sizes in shipbuilding. Especially noteworthy was the No. 311 Band Ship Saw, and when the shipbuilders and lumbermen began thinking about wooden ships of large size, details of this machine had been completed and construction started. The first lots of these machines produced were quickly taken up, and when the United States Shipping Board was organized wooden ship construction was already well under way, and twenty Fay-Egan 'o. 311s in operation. Now there is practically no yard of consequence in either the East, West or Gulf Coasts, in Canada, and even Japan, that is not already operating a No. 311. When history shall have written the events of these years, it may develop that the 'bit' done in advance by the Fay-Egan organization will have played an important part in the future of the peoples of the earth."

A Circular Addressed to Shipbuilders has just been published by Whittelsey & Whittelsey, naval architects and marine engineers, Whitehall building, New York. "Many of our clients are shipyards, who have found that the employment of our engineering and drafting departments results in better work at lower cost than if they maintained similar departments of their own. That we are rendering a valuable service to our shipyard clients is evidenced by the fact that we are at present handling contracts aggregating upwards of $4,000,000. In general, our organization is qualified to serve you in the following ways: 1. Preparation of preliminary plans and calculations for assisting in obtaining new business. 2. In preparing complete designs from the inception of the lines, all calculations, handling of model tests and machinery installations. 3. Fabrication. We have specialized and have a most competent organization for handling of full fabricating plans; and in one case we were able to so systematize that a saving of $25,000 was made in the cost of fabricating three steel ships. 4. Paneltype ship. We are prepared to have licenses issued for construction of the panel-type ship, which obviates the necessity of any fired work; that is the simplest form of construction known, and which may be classed in any of the classification societies. 5. Diesel engine power plants. Our Marine Engine Department, headed by one of the most experienced Diesel engineers, has saved many thousands of dollars for our clients. We have lately designed a 1,900 indicated horsepower full Diesel engine based throughout on principles employed in European practice, established through years of successful operation at sea. Inquiries regarding this engine design are solicited."

"More Cargo Space" is the title of a circular published by the Standard Oil Company of New Jersey, Fuel Oil Department, 26 Broadway, New York. "Steamers burning fuel oil need less bunker space and less weight of fuel than coal burners. They provide more cargo space in ships of equal register and develop greater speed and steaming radius. They require a smaller stoke hole gang. Standard fuel oil for bunker use is carefully refined—feeds freely and evenly—furnishes clean, intense heat—assures ample steam and maximum speed from dock to dock—and smaller costs for every hour at sea. This company is in a position to make deliveries at North and South American ports as well as European ports."

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Marine Hardware and Specialties are described in Catalogue B, just published by the William V. Dee Company, Bridgeport, Conn. "We have successfully developed standard hull fittings for merchant vessels. Our line includes water-tight doors with fittings, engine room skylight lifting gears, mess and galley lifting devices, toggle pins, skylight and other forged hinges as described and illustrated in the following pages. We are also developing other items, such as standard mast and boom fittings, rail and awning stanchions, manholes, non-watertight doors, thrust recess bulkhead doors and operating gear, and miscellaneous materials which will, in due course, be available as standards. The standards already developed have been widely adopted, and in our judgment the success in the future of the merchant marine will, in a large measure, depend on high-grade standard materials that are turned out on a commercial basis (finished articles) at reasonable prices. While we manufacture many items including our standard fittings, we can also supply a full line of ship chandlery beside representing in the marine field a number of specialty manufacturers. Your inquiries or blue prints for estimates on work requiring machining or castings of any kind will be given prompt attention, and our facilities are such as will insure high-grade workmanship and materials."

Nelson Valves is the title of a profusely illustrated cloth-bound catalogue of 156 pages published by the Nelson Valve Company, Chestnut Hill, Philadelphia, Pa. "A valve is a more important part of power equipment or other piping installations than many owners and managers at first recognize. There has been quite a widespread attitude that 'a valve is a valve,' and a tendency when purchasing this class of material to call on the handiest source of supply for 'just valves' and to be guided in selection largely by price. Such practice only leads to expense in maintenance and operation later on, for much money can be spent on poor valves and troubles resulting from them, far in excess of slight differences in first cost. Present severe demands on such engineering equipment are bringing about a more general and forceful realization of these facts. Nelson valves are made with recognition of the fact that a valve is really a very important part of engineering equipment. The Nelson line is based on the principle that refinements of design and construction of a valve, as well as other equipment, pay for themselves in Service, which is the real thing that is purchased and sold, and that cheap, inferior work and skimping of materials is poor economy for both the user and the manufacturer. High standards are set for Nelson valves, and they are built to standards rather than down to price. Our constant aim is to make every Nelson valve a thoroughly good valve, and to render real, satisfactory service to our customers."

Two-Bearing Over-All Equipment made possible by the Use of the Steam Motor, is the subject of a folder published by the Steam Motors Company, Springfield, Mass. "We would like to call your attention to our leaflet describing two-bearing over-all equipments made possible by the use of the Steam Motor. Our main object in adopting this construction is to produce the most reliable and simple equipment possible and also eliminate the vibration and misalignment troubles encountered in four-bearing units made up with a 'flexible' coupling. That these troubles are eliminated has been proven in the hundreds of sets now in operation. The Steam Motor is manufactured in all sizes up to 300 or 400 horsepower, depending upon operating conditions, and is designed for operation at any desired speed, either by direct connecting to the driven apparatus or by connecting through speed reducing gears. We would appreciate the opportunity of quoting on your requirements covering turbines for driving pumps, fans, blowers, generators and mechanical drive, or we can quote you on complete equipments should you desire. We would also suggest that when purchasing equipment of the type referred to above that you specify Steam Motor driven two-bearing equipment. We would be very glad to have one of our engineers call and discuss matter with you in detail if you desire."

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"The Engineer's Best Friend" is the claim made by the American Steam Gauge & Valve Manufacturing Company, Camden street, Boston, Mass., for the American Thompson Improved Indicator. "The parallel motion of the American Thompson improved indicator is by far the most accurate in existence. The errors which usually exist in drawing correct vertical lines with other indicators cannot possibly appear in the limited movement of the pencil in taking diagrams from a steam engine with the American Thompson indicator. The parallel movement of the pencil is secured by a link attached to and governing the lever direct. The pivots of this link are made free from any appreciable lost motion, and will remain so indefinitely; but if any lost motion should exist, it will affect the integrity of the parallel movement only to an extent equal to it, not three or four times that amount. In other movements where the parallel movement is affected by controlling the connecting rod, either by a curved slot in it and a guiding roller, or by attaching the link, the parallel movement becomes dependent for its accuracy on the fit of several parts, play in any one of which will cause an uncertainty and probable inaccuracy equal to three or four times the amount of such play. The force required to guide the lever of the American Thompson improved indicator in its parallel movement is received on the pivots of the link alone. In cases of the slot and roller device, this guiding force is received in several rapidly moving surfaces and multiplied in amount of leverage. The same is also true to a considerable extent where the link is attached to the connecting rod. The pencil lever has a ratio of three to one and is constructed as light as possible. It is guided by a short connecting link, which is fastened to the stationary arm or post of the parallel motion and is connected to the piston rod by a yoke provided with a hole slotted to take the indicator lead."

Crank Case Oil Bulletin No. 102 and Marine Bulletin No. 103 are published by the De Laval Separator Company, 165 Broadway, New York. "The De Laval Method of Oil Purification is a remarkable means of removing impurities from lubricating oils, restoring them to their original lubricating qualities. The oil purifier is used on all kinds of ships, from U. S. destroyers to motor-driven freighters. It is being put on old ships and ships now building; it keeps the lubrication system free from impurities. It purifies all kinds of oil equally well and removes all kinds of impurities, such as dirt, water, carbon, core-sand, pipe-scale, metallic particles, etc. The De Laval oil purifier is not affected by the motion of the ship. It is furnished in three sizes, each size in either electric, belt or direct steam turbine drive."

Gasoline Paint and Lubricating Oil Storage is the subject of Bulletin 95, published by the Wayne Oil Tank & Pump Company, 589 Canal street, Fort Wayne, Ind. "Storing, handling and selling paint and lubricating oils is to-day as much of a science as is the manufacture of these oils. The up-to-date dealer should realize the fact that each drop of evaporated, dirty or spilt oil is a loss of profit to himself. Just how to acquaint the dealer with these essential facts is made self-evident from absolute facts and figures, as shown on the opposite page. To eliminate evaporation, dirt, spillage, fire danger, absorption, incorrect measurement, loss of labor, loss of space, incomplete drawing of barrel contents, and finally the loss of the barrels themselves, there is but one logical solution. The self-measuring, air-tight, fireproof, compact, speedy and easily operated pump and tank solves the problem in a clean, inexpensive and profitable manner. The installation of either the first floor or long-distance pump and tank guarantees to the purchaser a method of storage, handling and selling oils with absolute safety, perfect measurement, greatest speed, least labor, practically no spillage or evaporation and requiring minimum floor space. The proof of any and all of these statements is so evident, when a careful study of fundamental costs and selling prices are considered, as to make lengthy explanation unnecessary."

SALE BY THE NAVY

OF GUNBOAT

There will be sold by sealed proposals, receivable at the bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12:00 o'clock noon, 28 February, 1920:—

Gunboat YORKTOWN, now in the Twelfth Naval District, 417 Sheldon Building, San Francisco, Calif.

Exact location may be ascertained from the Commandant of the district concerned, and should be obtained before making trip for inspection. Sales will be for cash to the highest bidder, above appraised value. Right to reject all bids reserved. Catalogues of sale and full information concerning the vessel, and the terms of sale, obtainable from the bureau of Supplies and Accounts, or Commandant of the above district. JOSEPHUS DANIELS, Secretary of the Navy. 1-14-20.

SALE BY THE NAVY

of SUBMARINE CHASERS No. 2, No. 3, No. 189, No. 200, No. 337, No. 418 and No. 434.

There will be sold by sealed proposals, receivable at the bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12:00 o'clock noon, 28 February, 1920:—

SUBMARINE CHASERS No. 418 and No. 434, now in the Third Naval District, Fleet Supply Base, 29th St. and 3d Ave., Brooklyn, N. Y.

SUBMARINE CHASERS No. 200 and No. 337, now in the Sixth Naval District, Peoples' Office Building, Charleston, S. C.

SUBMARINE CHASERS Nos. 2, 3 and 189, now in the Eighth Naval District, Building No. 8, Naval Station, New Orleans, La.

Exact location may be ascertained from the Commandant of the district concerned, and should be obtained before making trip for inspection. Sales will be for cash to the highest bidders. Right to reject all bids reserved. Catalogues of sale and full information concerning the vessels, and the terms of sale, obtainable from the bureau of Supplies and Accounts or Commandants of the above districts. JOSEPHUS DANIELS, Secretary of the Navy. 1-14-20.

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SALE BY THE NAVY

of Tugs, Yachts, Motor Boats, Trawlers and Barges.

There will be sold by sealed proposals, receivable at the bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12:00 o'clock noon, 21 February, 1920:—

Trawler EAST HAMPTON S. P. 573, Tug CHARLES MANN S. P. 522, PATROL No. 10 S. P. 85, now in the First Naval District, Navy Yard, Boston, Mass.

Tug DOROTHY CULLEN S. P. 2183, Yacht MARGARET S. P. 524, Converted Yacht MONTAUK S. P. 1213, Motor Patrol KATYDID S. P. 95, Yacht STURDY S. P. 82, now in the Third Naval District, Fleet Supply Base, 29th St. and 3rd Ave., Brooklyn, N. Y.

Barge YENRUT IV S. P. 3040, is now in Fourth Naval District, Navy Yard, Philadelphia, Pa.

Motor Boat HOPKINS S. P. 3294, is now in Fifth Naval District, Naval Operating Base, Hampton Roads, Va.

Motor boat LADY ANNE S. P. 154, is now in Sixth Naval District, Peoples Office Building, Charleston, S. C.

Patrol boat SATELLITE S. P. 1012, is now in Seventh Naval District, Naval Station, Key West, Fla.

Motor yacht VIRGINIA S. P. 274, is now in Ninth Naval District, Naval Training Station, Great Lakes, Ill.

Exact location may be ascertained from the Commandant of the district concerned, and should be obtained before making trip for inspection. Sales will be for cash to the highest bidders. Ten per cent deposit required with bid. Right to reject all bids reserved. Catalogs of Sales and full information concerning the vessels, and the terms of sale, obtainable from the bureau of Supplies and Accounts, or Commandants of the above districts. JOSEPHUS DANIELS, Secretary of the Navy. 1-10-20.

SALE BY THE NAVY

OF TRANSPORTS

There will be sold by sealed proposals, receivable at the bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12:00 o'clock noon, 21 February, 1920:—

Transport YALE S. P. 1672, Transport CHARLES (ex HARVARD) S. P. 1298, now in the Fourth Naval District, Navy Yard, Philadelphia, Pa.

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SALE BY THE NAVY

of Destroyer, Yacht and Gunboats.

There will be sold by sealed proposals, receivable at the bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12:00 o'clock noon, 21 February, 1920:—

Destroyer HOPKINS, now in the Fourth Naval District, Navy Yard, Philadelphia, Pa.

Yacht AILEEN, now in the Third Naval District, Fleet Supply Base, Brooklyn, N. Y.

Gunboat ISLA DE LUZON, now in the First Naval District, Navy Yard, Boston, Mass.

Gunboat YANTIC, now in the Ninth Naval District, Naval Training Station, Great Lakes, Ill.

Exact location may be ascertained from the Commandant of the district concerned, and should be obtained before making trip for inspection. Sales will be for cash to the highest bidders. Right to reject all bids reserved. Catalogs of Sale and full information concerning the vessels, and the terms of sale, obtainable from the bureau of Supplies and Accounts, or Commandants of the above districts. JOSEPHUS DANIELS, Secretary of the Navy. 1-12-20.

SALE BY THE NAVY

of YACHT and MOTORBOAT.

There will be sold by sealed proposals, receivable at the bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12:00 o'clock noon, 21 February, 1920:—

Yacht HAUOLI (ex California) S. P. 249, now in the Third Naval District, Fleet Supply Base, 29th St. and 3rd Ave., Brooklyn, N. Y.

Motor boat RAINIER, now in the Twelfth Naval District, 417 Sheldon Building, San Francisco, Calif.

Exact location may be ascertained from the Commandant of the district concerned, and should be obtained before making trip for inspection. Sales will be for cash to the highest bidders. Ten per cent deposit required with bid. Right to reject all bids reserved. Catalogs of Sale and full information concerning the vessels, and the terms of sale, obtainable from the bureau of Supplies and Accounts, or Commandants of the above districts. JOSEPHUS DANIELS, Secretary of the Navy. 13-1-20.

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"Superheated Steam" is the title of a pamphlet issued by the Power Specialty Company, 111 Broadway, New York. This publication covers the following subjects: The possible percentages of steam savings and corresponding fuel savings through the use of superheat. How plants should be laid out for the maximum benefits of superheat. The theory of the effect and protection of superheat and engine cylinders and in turbine blades and vanes. Suitable material and sizes for lines and fittings in connection with superheat. Pressure drop from pipe friction and how reduced by superheat. What to look for and what to look out for in choosing a superheater. The theoretical and practical superiority of Foster Superheater construction with regard to both high efficiency and permanent care-free service. This book is written in simple language and filled with information that every well informed steam user ought to consider seriously.

The discussions of subjects indicated at the left show the way to important economies and possibilities, and there is a further discussion of superheater construction which is very important to those who seek the full and lasting undiminished benefits from the intelligent use of superheat. Foster Superheaters are built now in the light of 20 years' American experience by the pioneers in superheater development, and have been the recognized leaders from the very introduction of superheat. Their correct use affords one of the best possible means of combating present-day high fuel and power plant labor costs, so the question of getting the benefits of superheat is now more urgent than ever. Let us refer you to some of the 9,000 satisfactory Foster Superheater installations. If you are responsible for marine power plant design or management, send for this book and tell enough about your plant so that we can give you free but valuable advice.

"The De Laval Oil Purifier" is described in Marine Bulletins Nos. 102 and 103, published by the De Laval Separator Company, 165 Broadway, New York. "The De Laval centrifugal oil purifier is simple in construction and operation. This simplicity means long life and freedom from repairs, and is the outcome of over forty years of unquestioned leadership in the manufacture of centrifugal machines. The De Laval oil purifier is the simplest and, at the same time, the most effective means of eliminating grit, dirt, carbon, water and other impurities from crank-case and other lubricating oils, instantly restoring them to original usefulness. The oil purifier is built in three sizes, and with electric, belt or direct-steam turbine drive. It occupies less than two square feet of space and uses very little power."

Rainbow Acetylene Hose is one of the many varieties of rubber hose described in bulletins published by the United States Rubber Company, 1790 Broadway, New York. "There is a brand of United States Rubber Company hose to meet every marine requirement. Rainbow acetylene hose is a light, flexible hose that will not kink when bent abruptly, and that has a great margin of safety over the pressure normally met in welding. The cover is designed to withstand the abrasion met in shipyards, and is colored red or black to designate oxygen or acetylene lines respectively."

The Burke Electric Company, Erie, Pa., manufacturer of direct- and alternating-current machinery, has issued a folder giving a list of some of the motors and generators in stock, and also showing some of the alternating-current motors nearly completed for stock, which can be shipped within two weeks. They state, "There is in addition a constant procession of partly finished machines in process coming through the works, enabling us to make prompt shipment of many sizes not in stock. Your inquiries are solicited and welcome for information on electric generators and motors to suit your own specific requirements, both alternating and direct current, and from 1,000 kilowatts down to the smallest household motors."

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Automatic Oil Circulating and Filtering Systems are described in Bulletin S-25 issued by the Richardson-Phenix Company, 120 Reservoir avenue, Milwaukee, Wis. "After fifteen years of engineering and manufacturing experience—years of pioneer work in the development of scientific lubrication—the products of the Richardson-Phenix Company have come to be recognized as standard and Richardson-Phenix lubrication engineers as the final authority on all problems pertaining to scientific lubrication. In order that all products and all literature and advertising of this company may be instantly identified, our new trade-mark has been adopted. This mark is more than a mere label—it is a symbol of a service we alone can render, a service that embraces every branch of scientific lubrication, the correct application, reclamation and handling of lubricating oils. It stands for the highest development of one of the most important contributions in the industrial world. It represents a great advancement in engineering science."

The Application of Superheated Steam to Marine Engines is the subject of an illustrated booklet published by The North Eastern Marine Engineering Company, Ltd., Wallsend-on-Tyne, England. The advantages to be gained by fitting superheaters are set forth in this catalogue as follows: "With either turbine or reciprocating engines there is saving in steam consumption by using superheated steam instead of saturated. There is also a saving in fuel consumption, either with coal or oil, due to the smaller quantity of steam to be produced. Due to the decreased consumption, the size of the boilers may be reduced for equal powers, or alternatively a greater power may be developed with the same size of boilers. The bunker capacity may also be reduced, and, if necessary, the carrying capacity of the vessel correspondingly increased. The losses due to cylinder condensation in reciprocating engines are avoided by using superheated steam, resulting in a dry engine platform, with no water running from piston and valve rod glands. With steam turbines the use of superheated steam reduces the possibility of erosion of the blading caused by the impact of particles of water carried with the steam, as in the case of wet steam. With superheaters fitted to coal-fired boilers there is less fluctuation of pressure when cleaning fires, and the full boiler pressure may be more constantly maintained at the maneuvering valves. With either turbine or reciprocating engines, in order to obtain maximum economy it is necessary to use superheated steam. This has for long been recognized in connection with electric generating stations on land, and has also been clearly proved in marine installations. Superheaters are being fitted in all the new construction of our largest and most progressive shipping concerns."

Sturtevant Steam Engines are described in Special Catalogue No. 239, just published by the B. F. Sturtevant Company, Hyde Park, Boston, Mass. "Sturtevant steam engines are now made in two types only—VS-7 and VS-8 (vertical, single cylinder). All others have been eliminated to enable us to meet the demand for these two types. The difference between these two is one of lubrication—VS-7 is gravity, while the VS-8 is forced feed—both systems have their friends. These engines were designed to fulfill the U. S. Navy specifications, which means that they must have the utmost reliability under all conditions of service. Our engine department was 100 percent engaged in Government work, and we are proud of the fact that our standard engines were accepted without a single alteration. These engines are both used for direct connections to blowers, fans, generators, and for independent power service, automatic and throttling."

Tackle Blocks are described in an illustrated catalogue published by the Parish Supply & Manufacturing Company, 2856 Quinn street, Chicago, Ill. "We make tackle blocks with a safety factor of five to one. The safe working load of each block with shackle fitting is equal to that of the best quality manila or plow steel wire rope used, with a safety factor of five to one. Scientifically built to stand the strain of strenuous service, Parish dependable tackle blocks mean safety to life and property—ease and smoothness in handling all loads—and enduring economy in operation."

The Benson Electric Telemotor is described and illustrated in a bulletin issued by the American Engineering Company, Philadelphia, Pa. "Electric control is the ideal form of transmission. It insures more sensitive control and greater ease of operation than any other. It relieves you of worry about air traps or temperature conditions. It eliminates the necessity of keeping a long line of shafting and gears in perfect alinement. Stretching will not in any way lessen its effectiveness, so that point need not worry you. It is so simple that it is almost impossible to get it out of order."

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Lowman & Hanford Co., First avenue and Cherry street, Seattle, Wash.
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Navy Department, Washington, D. C.

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NATIONAL ASSOCIATION OF ENGINE AND BOAT MANUFACTURERS
29 West 39th Street, New York City.

UNITED STATES NAVAL INSTITUTE
Naval Academy, Annapolis, Md.

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5 Adelphi Terrace, London, W. C.

INSTITUTION OF ENGINEERS AND SHIPBUILDERS IN SCOTLAND
39 Elmbank Crescent, Glasgow.

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Wanted—Steel Tug, 100 to 115 feet long, 500 to 700 horsepower. New boat preferred. Address, giving full particulars, *P. O. Box* 477, Charleston, S. C.

Naval Architect and Marine Engineer open for an engagement, wide experience abroad and in this country on all classes of marine construction. Address *Architect,* care of MARINE ENGINEERING.

Wanted—By a Delaware River shipyard, first-class man for engineering and estimating work. Man with technical training and shop and sea experience preferred. Addres *Delaware,* care of MARINE ENGINEERING.

A Capable Ship Draftsman, with twelve years' experience in marine work, desires position as chief hull draftsman or hull inspector with a reliable shipbuilding company or steamship company. Must be permanent. Address *Box* 12, care of MARINE ENGINEERING.

Wanted—Technical Graduate familiar with Marine Engineering specifications, first-class marine engine, electrical and pipe draftsmen. Permanent positions for right men in shipyard near New York City. Address *Graduate,* care of MARINE ENGINEERING.

Marine Engineer—Wanted for an important and permanent position a high-grade marine engineer to take full charge of work. Excellent opportunity; large company; location New York. Address *Box* 28, care of MARINE ENGINEERING.

Position Wanted as Purchasing Agent—Seventeen years' shipyard, railroad and manufacturing experience. Stores and shop systematizer. New construction and repairs. References furnished. Address *Box* 48, care of MARINE ENGINEERING.

To Represent U. S. Firms in Germany—A leading engineer in Europe, who superintended construction of largest vessels of the world, is in excellent position through acquaintance in highest steamship circles, shipbuilding and machine construction companies in Germany, to represent American manufacturers of all kinds of machinery, tools and mill supplies, etc., and is willing to make such arrangements as will satisfy American firms looking for representation. Write, giving full details to *Chief Engineer L. Christlieb,* Schulweg 48, Hamburg 19, Germany.

Chief Hull Draftsman, open for position with live-wire company. Thorough knowledge of estimating, designing and construction of tankers, cargo and passenger ships. Practical knowledge of marine engineering. At present employed. Address *C. H. D.,* care of MARINE ENGINEERING.

Hull Draftsman, 12 years' experience, wants position as charge man or production engineer, vicinity of New York or New England. Address *Draftsman, Box D-12,* care of MARINE ENGINEERING.

Marine Chief Engineer, with most exceptional sea repair experience, all parts of the world, requires permanent position. Thorough machinist. Take entire charge of Ship Repair Yard plant. Address *Box M-1,* care of MARINE ENGINEERING.

Wanted at Once, Twenty Experienced Marine Draftsmen by a large shipbuilding corporation with a large amount of work on hand. Must have had marine engineering experience which will qualify for high-grade work. Send application, stating full experience and salary expected, to *Box* 55, care of MARINE ENGINEERING.

Mechanical Engineer—Graduate of two colleges, has had full charge of materials in large Eastern shipyard, recently closed, wants position with engineering or contracting company. Can handle men. Will go anywhere. Age 29. Salary, $70 per week to start. *J. K. Smith,* West Park, N. Y.

Oil Engine Drawings for sale in full sets of standard shop working drawings. For 5,000- and 9,000-ton steamers, four-cylinder, 24 by 36, 1,450 horsepower, by 96 sheets, $1,200; for tugs, four-cylinder, 18 by 27, $1,000, and four-cylinder, 16 by 24, $900. For yachts or as auxiliaries, steel column crosshead type, 10 by 12, $900; 6 by 8, $600; 4 by 5 trunk piston, $300. Address *Fuel Oil,* care of MARINE ENGINEERING.

The Waterbury Rope Handbook is a 122-page cloth-bound manual published by the Waterbury Company, 63 Park Row, New York. In it may be found a great amount of information on the subject of wire rope. "Splicing a wire rope, rigging a thimble, sheave and drum tables, comparative strengths, factors of safety, construction and lays—anything else you might want to look up about wire rope is there in 'quick-findable' form in the Waterbury Rope Handbook, a 220-page cloth-bound manual with more rope dope in it than can be found between two covers anywhere else. And a copy will be sent free at your request. The Waterbury Company has only one standard for the rope it makes—quality. Grade for grade, Waterbury wire rope, like every other Waterbury rope, has no superior."

"Monel Metal" is the title of a booklet published by the International Nickel Company, 43 Exchange Place, New York. "Monel Metal is a natural alloy of nickel and copper—non-corrodible—strong as steel—tough and ductile. Withstands acids, high temperatures and erosive action of hot gases and superheated steam. Can be machined, cast, forged, rolled, drawn, brazed, soldered and welded—electric or oxy-acetylene method. Takes and retains a perfect nickel finish. Monel Metal is manufactured in the form of rods, castings, forgings, wire, strip stock, sheets, etc. In the marine field Monel Metal has proved its immunity from the corroding action of water, steam or acids and from salt-air exposure. Also, its superiority over other metals for pump rods, pump lines, valves and valve seats, and for use in exposed locations on shipboard, such as stair-nosings and hand rails. The Monel booklets show many other uses for which Monel has proved superior."

Power Machinery is listed and priced in a catalogue recently issued by MacGovern & Company, Inc., 114 Liberty street, New York. The prescript to this catalogue states: "The pages list a stock of high-grade power machinery unequaled in scope and diversity and ready for immediate shipment. Each item here listed will go to its purchaser with the MacGovern guarantee that it is exactly as represented—a guarantee backed by a responsibility equal to that of the original manufacturer of the machine. This guarantee is based upon inspection, prior to purchase by this company, by competent engineers selected for their knowledge and experience of the particular class of machine. This inspection permits sale of each item with positive knowledge of its operating condition and with a definite understanding of the service it still is capable of rendering. We are the largest dealers in used power machinery in America. Our methods, our reputation, our responsibility, our volume of business, have given us this commanding position in the re-sale markets. No one concern manufactures all the classes of apparatus we sell. Yet we have built up an engineering organization which has repeatedly proved its ability to advise with authority upon the selection, installation and operation of any machine offered. This engineering service—free to our customers—is one part of the 'plus' value offered the trade, and has been a large factor in the uniform satisfaction that has followed purchases made from us. Financial responsibility—unequaled stock—expert engineering service—immediate shipment—these are the four obvious reasons for the purchase of MacGovern power machinery. We invite, and strongly urge, inspection of apparatus by the prospective buyer, and we will reserve under option when this is done. Otherwise, all items here listed are subject to price change without notice, and are offered subject to prior sale."

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Even Where Fuel Costs Nothing It pays to Use 85% Magnesia

THE Kaul Lumber Company's saw mill at Kaulton, Ala., is a model of modern industrial efficiency.

The 2,000 H P boiler not only provides the power for all mill operations but also furnishes an ample supply of steam for the drying kilns and other buildings.

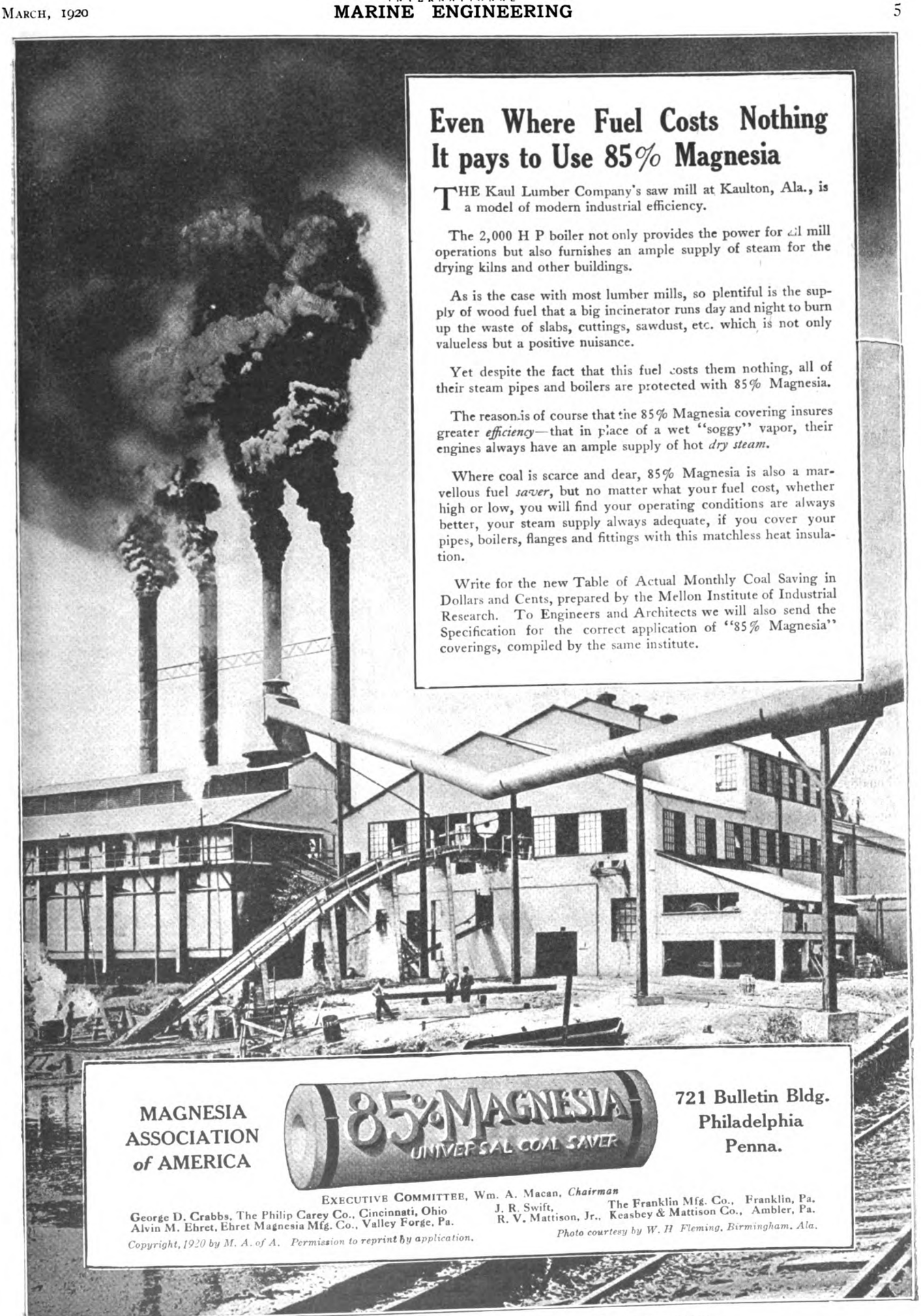
As is the case with most lumber mills, so plentiful is the supply of wood fuel that a big incinerator runs day and night to burn up the waste of slabs, cuttings, sawdust, etc. which is not only valueless but a positive nuisance.

Yet despite the fact that this fuel costs them nothing, all of their steam pipes and boilers are protected with 85% Magnesia.

The reason is of course that the 85% Magnesia covering insures greater *efficiency*—that in place of a wet "soggy" vapor, their engines always have an ample supply of hot *dry steam*.

Where coal is scarce and dear, 85% Magnesia is also a marvellous fuel *saver*, but no matter what your fuel cost, whether high or low, you will find your operating conditions are always better, your steam supply always adequate, if you cover your pipes, boilers, flanges and fittings with this matchless heat insulation.

Write for the new Table of Actual Monthly Coal Saving in Dollars and Cents, prepared by the Mellon Institute of Industrial Research. To Engineers and Architects we will also send the Specification for the correct application of "85% Magnesia" coverings, compiled by the same institute.



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General News and Technical Notes

BIG SHIPYARD SOLD

Pusey & Jones Plant Bought By Baltimore Dry Dock and Shipbuilding Company

The Pusey & Jones shipbuilding plant at Gloucester, N. J., has been purchased by the Baltimore Dry Dock & Shipbuilding Company, according to advices just received from Baltimore.

The plant, which has 1½ miles of waterfront, and covers 179 acres, comprises the former property of the Pennsylvania Shipbuilding Company and the New Jersey Shipbuilding Company. It has eleven shipways, and has a complete equipment for the construction and repair of vessels of all sizes except the very largest. The purchase price was not named but the property represents an investment of $5,000,000.

Formal transfer will be made on the settlement of differences between the Pusey & Jones Company and the Shipping Board over construction contracts canceled by the Board. The Wilmington, Del., plant of the Pusey & Jones Company is not affected by this deal.

1,000-FOOT PIERS PLANNED

Providence, R. I., Working for Big Improvements

Plans for the development of important port facilities at Harbor Junction, in South Providence, are being seriously considered. Tentative plans have been drawn for three 1,000-foot piers, at the property of the New Haven Railroad lying along Allen's avenue, and include a terminal warehouse and trackage connecting with the New Haven tracks. The plans are being developed by Jonathan Starr, of New London, Conn., representing the Eastern Terminal Corporation. This concern has recently secured land on Branch avenue for the construction of a warehouse, and is engaged in similar undertakings in Boston, New Haven and New York. The development would be begun by the building of one pier and the warehouse, and additional facilities would be added as needed. It is probable that the plans would include a grain elevator, which the Providence Chamber of Commerce is working for. Mr. Starr holds that the prospects of the port call for a large addition to its present facilities and justify plans for 1,000-foot piers to take care of increased tonnage.

New Piers at Camden, N. J.

Under the guidance of Mayor Charles T. Ellis, of Camden, N. J., a vigorous programme of improvements is being put through by the City Council, including two new piers to class with the largest on the Delaware River. Contracts have already been let for these piers, which are to be 350 feet long, and between the present Spruce street and Walnut street wharves. The northern pier will accommodate a ship 600 feet long, and the southern pier a ship 480 feet in length. The plan also calls for a big marine terminal, the entire project to cost $3,000,000. A bond issue of $500,000 has already been authorized, and work will begin as soon as weather conditions permit.

WILL BE OIL BURNERS

Union Steam Ship Company's Fleet Being Altered

Work has begun at the Union (San Francisco) plant of the Bethlehem Shipbuilding Corporation, Ltd., on changing from a coal burner to an oil burner the 8,000 gross tons steamer *Tahiti*, of the Union Steam Ship Company, of Dunedin, N. Z. This is the first of the three steamers on the run between Australia and San Francisco to be changed, and the other two will be overhauled and converted as soon as possible. Then, the officers say, they will be able to keep the ships clean. Although there has been no official announcement to that effect, it is believed in San Francisco that the Union Line intends to convert every vessel it owns into an oil burner.

There are 59 vessels listed in the Union Steam Ship Company's fleet, ranging from the 13,415-ton *Niagara* and the 12,260-ton *Armagh*, down to the 260-ton *Terawhiti* and the 112-ton *Tuatea*, all except three small ones having been built in United Kingdom yards.

The restoration of an adequate service between San Francisco and Australia will divert a large volume of travel from the Suez route to San Francisco, according to Sydney advices. Owing to the movement of troops from Europe the facilities of the westbound lines from Sydney are crowded, and the civilian and commercial travelers have little choice offered.

RED CROSS HONORED

Freighter Named After Organization's Cable Address

The *Amcross* is one of the latest acquisitions to the United States Merchant Marine. She was launched at the yard of the Merchant Shipbuilding Corporation at Chester, Pa. Amcross is the cable address of the American Red Cross, and was designated as the name of the new ship by the Shipping Board, under whose supervision the vessel was built. Miss Margaret Farrand, daughter of Dr. Livingston Farrand, chairman of the Central Committee of the Red Cross, broke the time-honored bottle over the ship's prow as she started down the ways.

The *Amcross* is a standard fabricated steel cargo vessel having a loaded displacement of 12,415 tons, 401 feet long, with 54-foot beam and a depth of 34 feet. She is of 9,000 deadweight tons, and will have a speed of 11 knots. The keel was laid on May 26, 1919.

Handy Indicator Cord Hook

An indicator cord hook has recently been developed and patented by the Trill Indicator Comapny, Corry, Pa., which enables the engineer quickly to connect the indicator cord with the crosshead of a high speed engine.

The three accompanying illustrations clearly show how the hook is attached while the engine is running. The loop of the hook is held between the thumb and the finger as illustrated in Fig. 1, in such a position as to allow the pin on the standard to strike the straight part of the hook when the standard is within about one inch of the end of the travel. The hook swings about the thumb and finger as a pivot, as illustrated in Fig. 2, which action shoves the hook downward. At that instant the piston has reached the end of its stroke. On the return stroke, the pin on the standard engages the hook as illustrated in Fig. 3, and the attachment is complete.

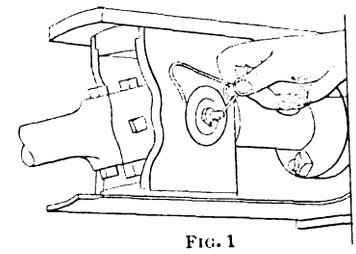

FIG. 1

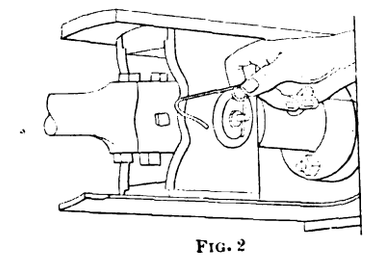

FIG. 2

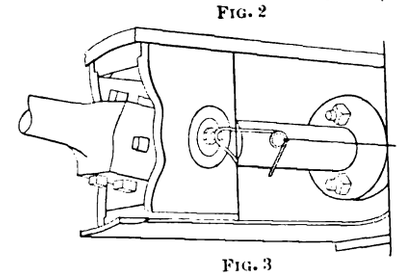

FIG. 3

Handy Indicator Cord Hook

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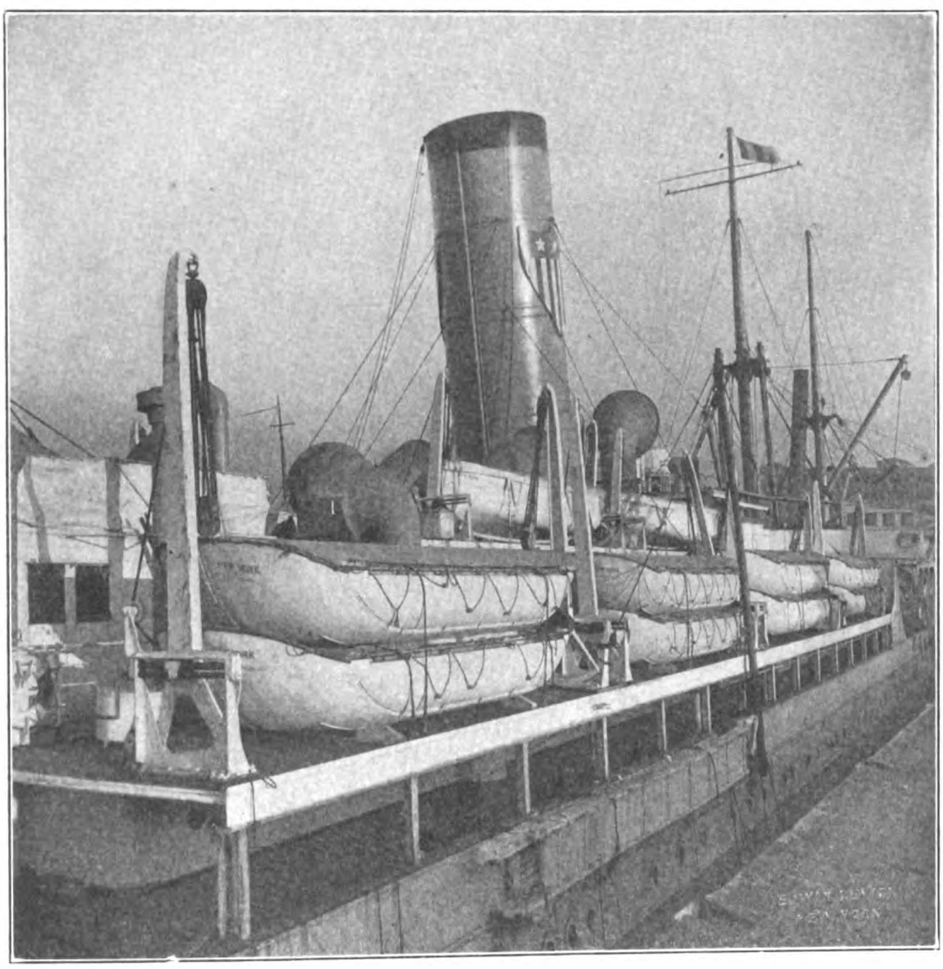
SAFETY AT SEA



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GOVERNMENT DISPLAYS AT MARINE EXPOSITION

Shipping Board and Department of Commerce to Have Exhibits

The United States Shipping Board will be represented at the forthcoming National Marine Exposition, in the Grand Central Palace, this city, April 12-17, 1920, by an elaborate three-part exhibit which will depict all phases of the Shipping Board's work since its inception. A special committee to prepare the exhibit has been appointed by Chairman Payne. Official co-operation of the Shipping Board has been further extended by the consent of Chairman Payne to open the exposition in person.

The Department of Commerce will be represented by the exhibit of the Steamboat Inspection Service, the Bureau of Navigation, the Bureau of Fisheries, the Bureau of Lighthouses, and the Coast and Geodetic Survey. Important features of the Department of Commerce's exhibit will be lifeboats with full equipment required by the Steamboat Inspection Service on passenger vessels; fog horns, lamps and lenses employed in the lighthouse service, models of old-time fishing and whaling vessels and instruments, side by side with modern vessels and equipment employed in the fishing industry, and a remarkable radio compass just perfected by the Bureau of Standards for the Bureau of Navigation. Moving pictures of the United States Government's seal herds in the Bering Sea will be shown, one scene showing 6,000 seals taking to the water at one time.

Tentative plans for the decoration of the Grand Central Palace, where the exposition will occupy several floors, call for the flying of the house flags of all American steamship companies.

Pratt & Cady Branches

Announcement is made by the Pratt & Cady Company, Inc., of Hartford, Conn., of the appointment of Mr. E. Coit Magens as director of sales; Mr. O. Lamson Beach as manager, metropolitan store, 250 Canal street, New York City; Mr. Quay T. Stewart as sales representative, Minneapolis, Minn.; Mr. Henry J. Bride as sales representative, Hartford, Conn.; also the opening of branch stores at 529-531 Arch street, Philadelphia, Pa., Mr. H. H. Freund, Jr., manager; 505 Mission street, San Francisco, Cal., Mr. C. R. Mendelson, manager. In addition to their established lines of Renewable Disc Globe Valves, Renewable Seat Gate Valves, Regrinding Swing Check Valves and Asbestos Packed Cocks, the company now also manufactures the Davis & Berryman line of Feed Water Heaters, Hot Water Generators and Power Pumps, having purchased this business from I. B. Davis & Son, the original manufacturers. In addition, Pratt & Cady have purchased a welded steel tubing business, and will continue manufacturing welded steel tubing and fabricating the same into parts used by manufacturers of bicycles, motorcycles, automobiles, vacuum cleaners, metal bedsteads, etc.

Chicago Pneumatic Tool Company Holds National Sales Conference

The Chicago Pneumatic Tool Company on January 21 and 22 held a general conference of executives, plant and branch managers and salesmen at its Detroit plant, Second avenue and Amsterdam street, on the occasion of the formal opening of a large five-story addition. At this conference the tremendous expansion programme of the company for 1920 was outlined, calling for largely increased production, not only at Detroit but at the five other American plants of the company. It was reported that much of the proposed increase in production was already absorbed by orders for future deliveries.

The nation-wide chain of service stations which the company has opened and supplied with complete stocks of spare parts, machinery and tools, and provided also with facilities for handling territorial repairs for users of the company's products, was also outlined in detail.

Gill Piston Rings

On account of the large amount of reboring and regrinding of scored cylinders which is being done to-day, a tremendous demand has developed for oversize piston rings to equip pistons for such jobs. The Gill Manufacturing Company, of Chicago, is specializing in over-size rings for this class of work, and makes no extra charge for special over-size rings. Gill Piston rings are made to fit practically all motors, in sizes ranging from 2 inches to 12 inches. Gill piston rings which are over-size on the diameter can be obtained through jobbing and accessory houses throughout the United States, or inquiries can be addressed to the factory and they will be referred to the nearest jobber.

An Interesting Calendar

The Badenhausen Company, of Philadelphia, has issued an interesting 1920 calendar and poster through its Scotch marine boiler manufacturing department. A copy of this calendar will be sent to anyone desiring it upon receipt of 7 cents in stamps to cover postage. The calendar is instructive, in that it shows various steps in the Scotch marine boiler manufacturing process at the company's modern boiler plant at Cornwells, Penn.

A. E. Saunders Joins International Mercantile Marine

Mr. Albert Ed. Saunders has recently resigned as technical assistant to the Chief Surveyor of the American Bureau of Shipping, 66 Beaver street, to accept the position of Naval Architect in the Construction Department of the International Mercantile Marine, 9 Broadway, New York City.

HEAVY ORDER FROM JAPAN

Electric Motor For Slabbing Mill to Be Supplied By Westinghouse Company

An order for the first steel mill electric motor ever built for a large reversing slabbing mill, with a complete set of accessory apparatus, has recently been placed in this country by the Imperial Steel Works of Japan. The apparatus will be furnished by the Westinghouse Electric & Manufacturing Company, and the order is the second for electrical steel mill equipment to be received by this company from the Imperial Steel Works. The equipment is to be used with a slabbing mill with which it is expected to roll steel ingots weighing up to 25 tons, down to slabs having a maximum dimension of 17 by 46 inches and a minimum of 4 by 20 inches.

The motor will be of the double unit reversing slabbing mill type, of 5,800 horsepower continuous capacity and 17,600 hosepower momentary. It will have a speed range of 47 to 90 revolutions per minute, and will use direct current at a voltage of 700. Power for the motor will be furnished by a motor-generator consisting of two 700-volt direct-current generators driven by one alternating-current motor. The generators each will be of 3,000-kilowatt capacity, and will operate at a speed of 368 revolutions per minute. They are to be connected in series with the reversing motor, and will be designed to stand the same momentary current peaks that it does. The motor which drives the two generators will be of the eight-pole, wound-rotor induction type, and will be of 6,250-horsepower capacity. It will take 3-phase, 25-cycle alternating-current power at 3,300 volts. A 150,000-pound cast steel flywheel is to be used with this set. It will be composed of three sections, and will measure 14 feet 9 inches in diameter. Control for both the reversing motor and the motor generator set will also be furnished.

Another part of the equipment will consist of a three-unit exciter set consisting of two direct-current generators driven by an alternating-current motor. One generator will be of the constant potential type and rated at 62 kilowatts, 250 volts. The other will be series wound, and rated at 37½ kilowatts, 0-250 volts. This motor will be of the squirrel cage, 3-phase induction type, and rated at 125 horsepower, 440 volts, 25 cycles. The speed of the set is 720 revolutions per minute.

Other apparatus will consist of a blower driven by a 50-horsepower, 440-volt, 3-phase, 25-cycle, squirrel cage induction motor, an air washer and a 165-kv-a, 3-phase, 25-cycle, 440-volt/3300-volt transformer for supplying the blower motor and exciter set. A pump for circulating water will also be supplied, driven by a 7½-horsepower, direct-current, 1,200 revolutions per minute, 230-volt shunt-wound motor, equipped with starter and start and stop push buttons.

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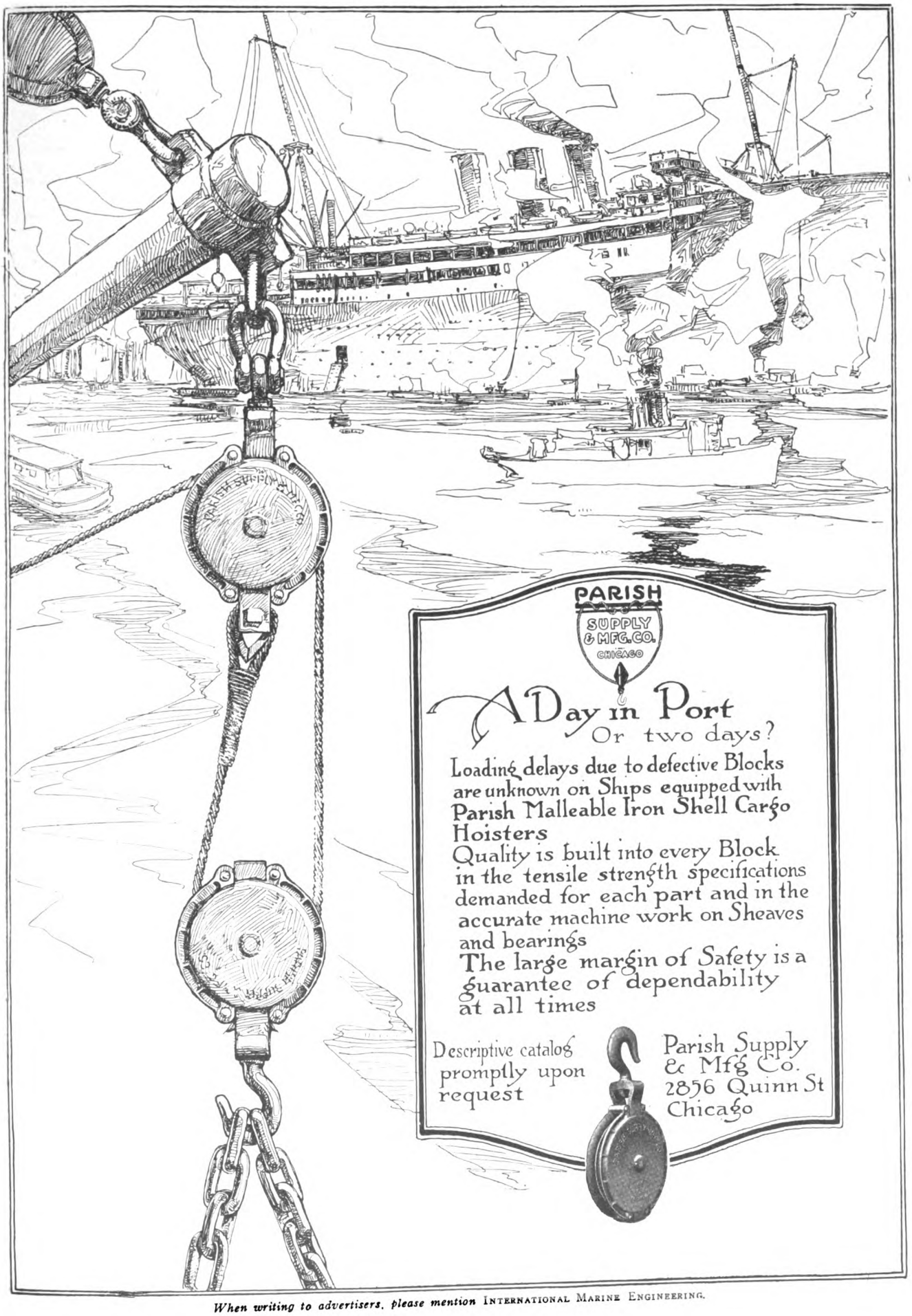
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CORY ANNIVERSARY

Marine Electrical Equipment House 75 Years Old and Growing

Charles Cory & Son, Inc., of 290 Hudson street, New York City, will celebrate their seventy-fifth anniversary this spring by moving into their modern, reinforced concrete and glass factory building, now nearing completion on the corner of King and Varick streets, New York City. The story of the Cory Company is an interesting one, having begun when steamships were scarce, and to commemorate its seventy-fifth anniversary a history of the institution is now in the course of preparation by J. S. Jones, engineer of the firm. Its publication is expected to appear about the time when the company will move into its new factory.

Charles Cory established the business in 1845, at which time it consisted of the manufacture and installation of brass railings for ships, ships' bells, bell pulls,

John M. Cory, President

voice tubing, etc. Later on, however, upon the advent of the mechanical engine telegraph, this company was the first in the country to manufacture this appliance, and has always been a pioneer in designing and manufacturing signaling equipments for ships.

Three generations of Corys have guided the course of the company since its inception, and it has constantly and consistently taken the lead in the development of marine requirements for electrical and mechanical signaling devices, as well as lighting equipments for the various navies and the merchant marine service.

John F. Cory, son of Charles Cory, managed the business from 1866 until 1892 During this period the firm started the manufacture and installation of electrical telegraphs and other electrical signaling apparatus for the navy and merchant marine. Charles Cory, 2d, grandson of the founder, was the third member of the family to assume charge of the business. His career of 22 years ended with his death in 1914.

John M. Cory, president and treasurer, and the second grandson of the founder, is largely responsible for the firm's more recent rapid growth. Due to his able administration as president and treasurer, and to the many inventions of marine electrical appliances by Frank W. Wood, vice-president, the Cory Company has achieved an enviable reputation, and is among the foremost and largest manufacturers of marine electrical equipment in the world to-day.

Visualizing the growth of Charles Cory & Son, Inc., in the past seventy-five

F. W. Wood, Vice-President

years will be facilitated by comparative figures. The business originally started in 1845 at 278 Division street, New York City, where they occupied a total area of 1,500 square feet. To-day, in their three factories at 286 Spring street, 290 Hudson street, and 487-489 Greenwich street, the floor space occupied is in excess of 70,000 square feet. The new building will contain more than 100,000 square feet, and be completely occupied by the Cory Company. The firm has further expanded during the administration of John M. Cory, until it now has branches in New York, Philadelphia, New Orleans, Seattle and San Francisco; also offices in Bath, Camden, Baltimore, Newport News, Portland, Long Beach, Cal., and Canada, as well as agencies in all the principal cities of the United States.

The Cory Company is known the world over. By means of its many branches and branch offices it is enabled to give services in every important seaport on both the Atlantic and Pacific Coasts, which is a valuable asset to the purchaser of its appliances.

Gielow & Orr Separate

Announcement is made that the partnership between Henry J. Gielow and Alexander M. Orr, naval architects and engineers, at 52 Broadway, has been terminated as of January 3. The business will be carried on by Henry J. Gielow at the same address.

CONCRETE SHIPYARD TO BE NAVAL BASE

Scofield Plant, San Diego, Cal., Given Up By Shipping Board

The Shipping Board has turned over to the Navy Department a lease on 500 acres of waterfront property in San Diego, Cal., now occupied by the concrete shipyards of the Scofield Engineering Company, according to a San Francisco announcement. The Navy will take possession of the property immediately after the launching of the 7,500-ton oil tankers *San Pascual* and *Cuyamaca* this spring. The yard will be converted into a fleet repair base, and will be able to drydock vessels up to 3,000 tons.

Rear-Admiral Roger Wells has been selected to take charge of the new base.

To Increase Zinc Oxide and Lithopone Production

The New Jersey Zinc Company announces the contemplated construction of additional zinc oxide and lithopone plants to meet the rapidly growing demand for these products. It is the aim of the company to keep pace with the growing requirements for these products by the construction of additional plants. The company plans to construct its plants at strategic geographical points, so as best to serve its customers in various parts of the country. Construction work will be commenced immediately on plants in Colorado and Pennsylvania. The company has already provided its ore supply for this increased production, and it aims to place itself as early as possible in a position to supply adequately the requirements of the important industries which it serves.

The New Jersey Zinc Company was organized in 1848, and is the oldest and largest zinc company in America. Its ore properties are located in various parts of the country, and include the famous Franklin, N. J., mine, from which is secured zinc ore unequaled for purity anywhere in the world. The company is now operating zinc oxide, lithopone and slab zinc plants in Pennsylvania, Virginia, Illinois, Wisconsin, Kansas and Oklahoma. Its products are carried in warehouses in Brooklyn, Newark, Philadelphia, Pittsburgh, Cleveland, Chicago, Los Angeles and San Francisco. Other warehouses will be established as required. Sales offices are maintained in Chicago, Ill., and Pittsburgh, Penn., and at its headquarters in New York City.

With the manufacturing plants now in operation and those to be constructed, the company will be in the best possible position to serve promptly and economically its trade throughout the country.

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GETS PROFIT BOTH WAYS

Contractor Paid For Removing Hulls Finds Market For Them

Portland, Oregon., has furnished a shining example of how profits may be made in handling ships. The story is that George F. Rodgers, of George F. Rodgers & Company, of Astoria, has a contract with the Emergency Fleet Corporation by which he receives $5,000 each for disposing of the thirty-four unfinished wooden hulls remaining in shipyards as a result of the cancellation of contracts after the signing of the armistice.

Two of the hulls at the Grant Smith-Porter yards in Portland, and one at the Standifer Company's North Portland yard, have been sold by Mr. Rodgers to Captain W. Z. Haskins, of the Oregon Stevedoring Company, who will complete the hulls as soon as possible as five-masted schooners. Then he will operate them himself or sell them. They will have the latest equipment for the rapid handling of cargo, especially lumber.

In this case, Mr. Rodgers will receive $15,000 from the Government for ridding the shipyards of these hulls, plus the purchase price received from Captain Haskins. His only expenditure in this transaction is the cost of maintaining a small crew for a few days at the Grant Smith-Porter yard preparing the two hulls there for launching before he entered into negotiations for their sale.

Under Mr. Rodgers's present plan all the unfinished hulls on the ways in the United States are to be sold and completed, and none will be destroyed.

WORK OF SHIPPING BUREAU

2,234 Vessels of 5,790,729 Gross Tons Classified in 1919

At the annual meeting of the American Bureau of Shipping, at the head office, 66 Beaver street, this city, a few days ago, it was reported that for the year ending December 31, 1919, the records show the classification of 2,234 ships, of 5,790,729 gross tons, almost four times the tonnage of 1915.

There are at present building under Bureau supervision in this country a total of 3,656,336 gross tons, which includes all wood and steel ships being built by the Government and private ownership; this is approximately 85 per cent of all ships building in this country.

It was pointed out that upon the completion of the present programme the American Bureau of Shipping will have classified 20 percent of the world's total merchant fleet, which places it second in importance of all classification societies in the world.

Building Refrigerator Ships

Among the contracts which the Submarine Boat Corporation, 5 Nassau street, is putting through at the Newark Bay yards, is one for refrigerator ships for the International Products Company, 120 Broadway. Two of these, it is reported, are under way, and will be of 1,400 gross tons. They are to be ready in the late spring.

TO BUILD CONCRETE BOATS

Col. M. A. Butler Will Head New Concern at Norfolk, Va.

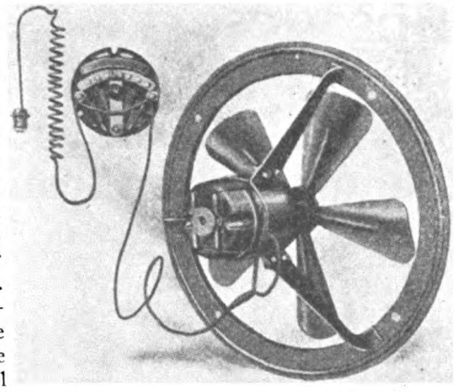
It has just been made public that Col. M. A. Butler, who has been in charge of the Army Base at Norfolk, Va., will be released from army service on March 15, and will assume the duties of president and general manager of the Norfolk Construction & Marine Repair Corporation, of Norfolk, which is to erect one of the most complete repair yards in that section, according to announcement, comprising three railways of 500, 1,200 and 3,000 tons, respectively, and ways and equipment for the construction of concrete barges and scows.

The plant is on the southern branch of the Elizabeth River, and consists of about 60 acres and has about a half mile of water front. This property was formerly owned by the National Concrete Boat Company.

The new concern has taken over the assets and holdings of the National Concrete Boat Company, and has a capital of $1,000,000. Its officers are: President and general manager, Col. M. A. Butler; vice-president, Robert D. Davis; chairman of the board, W. G. Schwartz; chief engineer, Arthur W. Deuel; directors, C. E. Herbert, J. A. Pretlow, W. Frank Robertson, Capt. C. S. Clark, S. E. Tillett, C. McI. Tunstall, S. H. Ellerson, Howard G. Avery, J. Murray Priest.

Ventilating Outfit

A fan having six speeds is being placed on the market by the Buffalo Forge Company, Buffalo, N. Y. It is claimed that the unit is economical in operation, with large capacity. The fan is



Six Speed Ventilating Fan

16 inches in diameter driven by an inclosed motor which will operate on a 110- or 220-volt, or a single-phase 25, 30, 40, 50 or 60 cycle alternating current circuit. The air capacity is 1,000 cubic feet per second, and the speed 500 to 1,000 revolutions per minute.

New York City Has National Safety Institute

A great forward drive toward the reduction of both industrial and public accidents in the Metropolitan district of New York has just been made through the appointment of R. S. Jarnagin, Regional Supervisor of Safety for the Eastern Railroads, United States Railroad Administration, as secretary of the New York Local Council of the National Safety Council and the Safety Institute of America. Headquarters of the New York local will be maintained in the office of the Safety Institute in the Arsenal building, Central Park. All the exhibits, the library and other facilities of the Institute will be placed at the disposal of the local council. The National Safety Council will send one of its field secretaries to New York to co-operate in the reorganization of the present local council of that city, along the lines of the local councils at St. Louis, Pittsburgh and Cleveland.

In view of the importance of the Metropolitan District as an industrial center this promises to be one of the most important councils yet organized. The New York local council will organize and conduct schools for safety supervisors and foremen, workmen's mass meetings, and conferences for industrial executives. The promotion of public safety, school safety and educational safety will be a distinct service of the Safety Institute, and will be carried on in the metropolitan district under the direction of the Institute, the National Safety Council co-operating.

The Safety Institute will soon be moved to the Arsenal building in Central Park. This building, which is being remodeled, will provide good accommodations for the various schools of the Council.

Selling Shipbuilders' Town

Dundalk, the town located near Sparrows Point, and including 531 modern homes for shipbuilders, which were built by the Emergency Fleet Corporation during the war for workers at the Bethlehem Shipbuilding Corporation, Ltd., plant, is to be sold. This is expected to give some relief to the Bethlehem's housing problem in Sparrows Point and Baltimore, as about half of these houses were vacant, as workers refused to rent them until they knew the terms of sale. The terms have been announced now, and the shipbuilders are to have the first preference.

To Build $4,000,000 Dock

The Dominion Government has completed the purchase of 750 feet of water frontage for a terminal site in Vancouver (B. C.) harbor. The property cost nearly a million dollars, and was bought from the Great Northern railway and the Weaver estate. The new pier to be erected this year will be just west of the Great Northern dock. The government dock with equipment, but not including site, will cost $4,400,000, it is announced.

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DRILLS SQUARE HOLES

Fairbanks Company's Device a Commercial Success

The only device that will drill a square hole in one operation, in any metal or substance, out of the solid material, without previous preparation and without subsequent finishing, is the "Radbore Head." This attachment is merchandized by The Fairbanks Company, Broome and Lafayette streets, New York, and carries the well-known "Fairbanks O. K."

The "Radbore" is a square-hole drilling attachment, based on the well-known principle of the Cardan Circles, which can be easily and rapidly attached to any milling machine or drill press.

Reference to Fig. 2 will explain just how it is done. The figure 1-2-4 is a cross section of the shank of a drill which is rotated inside a square guide, as shown by the outside lines. If cutting edges are ground on the end of the drill, as indicated in Fig. 2, they will sweep across the surface of a square with rounded corners. Hence if the drill is fed into the material it will cut out a square hole with filleted corners. To make a hole with sharp corners, a shank, as indicated in Fig. 1, 1-2-3-4 is used. One cutting

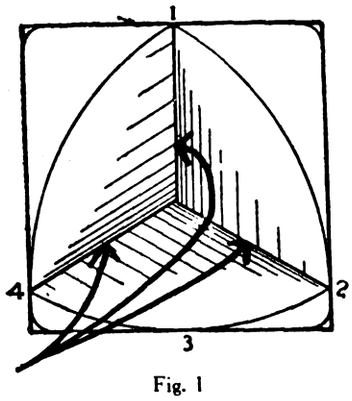

Fig. 1

edge is longer than the rest, and this goes into the corners to square them.

Development has made this tool one of surprising simplicity, positive action and minimum wear. The drills have a positive drive from the spindle of the machine, and the cutting lips follow a path determined by the adjustable jaws of the head, so that no preliminary round hole is necessary. The cutters are so designed that there is no material in the bottom of the hole which is not removed by the cutting edges; therefore, blind square holes can be obtained in one operation and without any subsequent finishing.

One of the most important features of the "Radbore" is the design of the drills. The drills are manufactured in two different styles—for brevity called types "A" and "B." Type "A" derives a hole with filleted or rounded corners. This fillet is one-eighth (⅛) of the drill size; and the radius, or the amount of stock that is left in each of the four corners of the square hole, is absolutely equal. This assures an equal distribution of power where a square hole (and the square hole is admitted by all engineers to be the most perfect drive) is used, either in a drive gear or in a drive shaft. Further, as a radius is left in the four corners, there is no possibility of the power being applied except on the four sides of the square, owing to the fact that the drive shaft is always milled flat on the edges, and hence will not touch in the corners of the square. The measurement across the corners of any square hole drilled by a type "A" drill can be quickly determined by multiplying the drill size by the constant 1.311.

The type "B" drill is designed for die work, the squaring of the ends of key ways, etc., and the driving of square

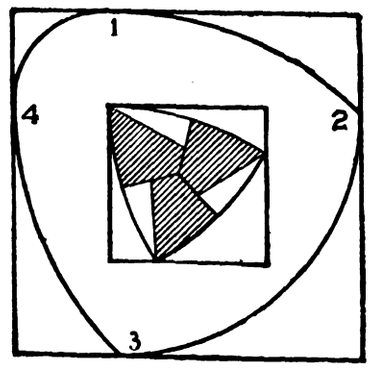

Fig. 2

holes with sharp corners. In other words, the type "B" drill is a great asset in the tool room for the quick and accurate completion of sundry jobs, while the type "A" drill is of the greatest commercial value out in the factory—on production.

The broach, being the first in the field, received much consideration and is now a production machine, although it carries the disadvantage of high maintenance cost, the possibility of mislead in the work; *i. e.*, the drilling of the round lead hole first.

The entire proposition of drilling square holes with the "Radbore" attachment has narrowed itself down to the ease and rapidity of round-hole drilling. Being a free cutting tool with sufficient chip clearance, a heavy pressure on the feed is unnecessary, and aluminum can be drilled as easily as the toughest steel—a perfect chip being thrown in either case. Additional advantages are those of obtaining a blind hole with a perfectly flat bottom; no chance of the drill being led off by sand or blow-holes; no previous preparation—the square hole being drilled from the solid; also, as the drills are sharpened on the end there is no loss in size resulting.

"Radbore" heads or chucks are manufactured in four sizes and two different styles—the range of drills, ⅛ inch to 2 inches, being as near equally divided between the four chucks as possible. Type "A" drills are manufactured from ⅛ to 2 inches by sixteenths, and the type "B" from ⅛ inch to 1¼ inches by sixteenths.

Numerous methods of machining and drilling square holes have been brought to public attention from time to time, and have generally been frowned upon by practical engineers and manufacturers with just cause. The general assumption concerning other tools producing square holes, especially those of the rotary type, is that they are too frail and will not stand up under quantity production. The "Radbore" has stood the test and has been a commercial machine for a number of years.

HEAVY STEEL CONTRACT

Barde Steel Products Company Buys From Shipping Board

The Barde Steel Products Company has been incorporated recently under the laws of the State of Delaware. Most of the directors are bankers from New York and the West. It has also been understood that this enterprise has been organized by M. Barde & Sons, steel, iron and machinery merchants of Portland, Ore. They have been in this line of business for the past twenty-five years, and are considered to be the largest iron merchants on the West Coast, and, of course, their names will also appear in the board of directors.

At the present time the corporation owns between 350,000 and 500,000 tons of steel, consisting of plates, shapes and bars of all descriptions, etc., which were recently purchased from the United States Shipping Board. The value of this contract runs up to about $30,000,000. It has also been stated that the same concern is negotiating for an additional large quantity of steel.

Mr. L. Baron, formerly manager of the engineering and chemical department of J. Aron & Company, Inc., was appointed general export manager of this new corporation. Mr. Baron has been recognized in the export business for the past fifteen years, and has traveled extensively over Europe, including Russia and the Orient, and has made very good connections in the foreign countries. All this, together with his technical training and the wide experience acquired, will, undoubtedly, enable him to sell a large portion of the material in question in the foreign markets, as he has a thorough knowledge of their demands.

Ship Upholstery Springs

Special springs have been produced for ship upholstery by Foster Brothers Manufacturing Company, Utica, N. Y. The filling of Foster upholstery consists of multiples of small springs made of high-grade carbon wire and specially tempered to produce long life. Springs are of the double cone type, knotted at both ends to prevent their working loose and into the padding. A metallic clip fastens them together securely so that the action of each spring is distributed over the entire system.

Finished cushions are available in sizes that are multiples of 3 inches, and with springs made of 14, 15 or 16 gage wire.

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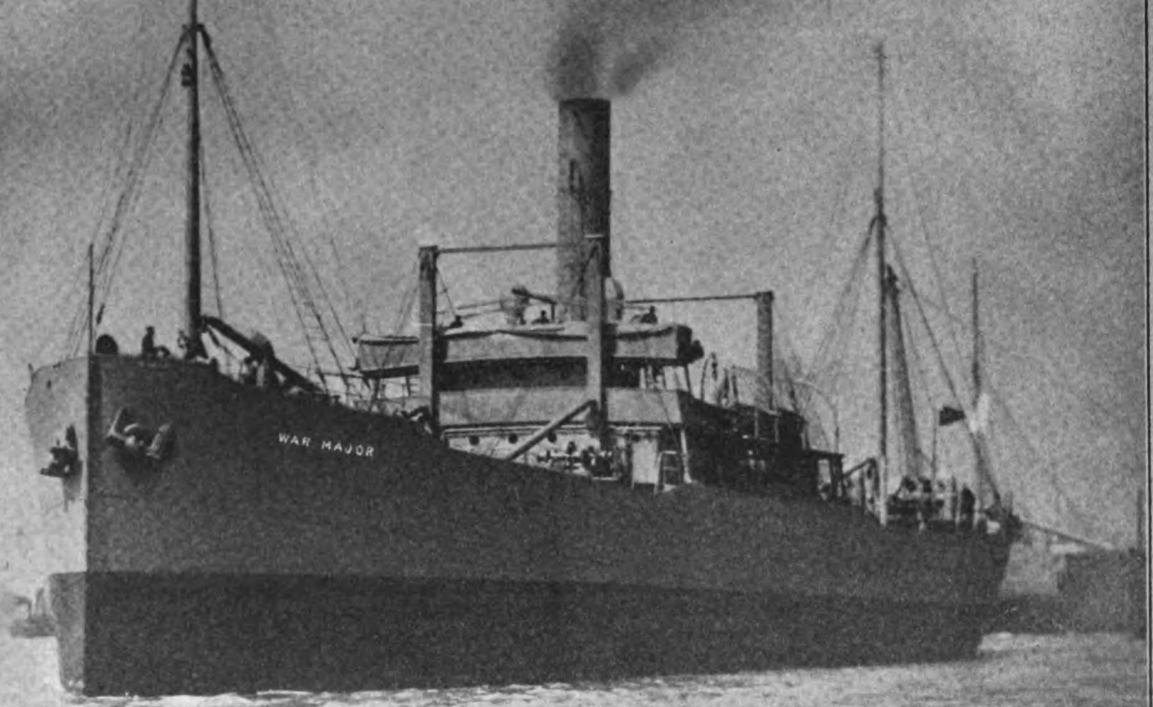

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CONVERT FERRIS HULLS

Four Ferris Type Boats to Be Changed to All-Steel Cargo Carriers

Through some skilfull handling of a difficult task by H. E. Ankener, naval architect, and L. C. Ripley, chief hull draftsman of the Terry Shipbuilding Corporation, of Savannah, the incomplete composite ships at the Terry yards at Port Wentworth, will now be converted into acceptable all-steel cargo carriers.

By the proposed change the deadweight tonnage of each vessel will be increased from 3,500 to 4,200 tons. The length will be increased forty-five feet, oil substituted for coal and a steel hull placed instead of the wooden one. Other changes are also to be effected.

It is said that the surveyors for the American Bureau of Shipping, 66 Beaver street, New York, declared that it was a great accomplishment to have solved such a difficult and long-tried problem so successfully, and that it was a wonderful improvement over the Ferris design. By making the proposed changes, the old composite ships can be not only utilized, but can be made very economical to operate, and will be vessels of the highest efficiency and classification.

EFFECTING BIG SAVINGS

Synchronous Motor More Economical Than Steam Engine

An excellent example of the superior economy of the synchronous motor as compared with the steam engine for driving ice machines, is the installation in the Manhattan street dairy of the Sheffield Farms Company, New York, where 80,000 quarts of milk are handled every day. This plant contains four 80-ton Newburg ammonia compressors and a 12-ton York compressor, which were driven by steam engines before the war. After America went to war, however, fuel was hard to get, its price rose rapidly, and the Government ordered all inefficient engine-driven ice plants to be closed down. The necessity of making some change in their drive was realized by the officials of the Sheffield Farms Company, so they decided to use an electric motor and obtain power from the local lighting company.

The present drive consists of a 500-horsepower Westinghouse synchronous motor, operating on a 440-volt, 60-cycle circuit, and which has a speed of 350 revolutions per minute. This motor is belted to a line shaft from which all of the compressors are driven, and, in addition, two 14 by 10-inch air compressors and two generators of 110 and 125 kilowatts, respectively, used for supplying current for local lighting. Current is supplied by the United Electric Light & Power Company.

While this installation, being originally planned for engine drive, is not arranged in an ideal manner, nevertheless the officials state that the efficiency of the motor is so much greater than that of the older drive that its savings and increase in capacity amount to $20,000 a year.

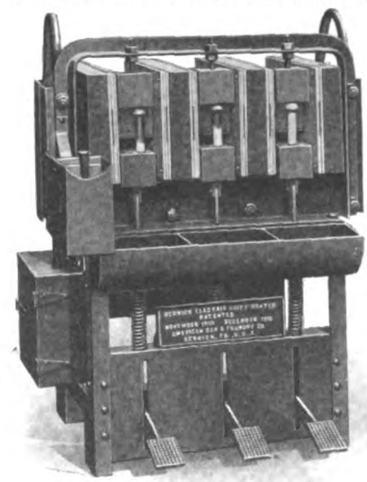
One of the interesting features of the installation, which is now recognized to be of great importance in ice plant management, is the careful attention given to the graphic meter chart, which shows the amount of power being used. Since the load is practically constant under given conditions, the curve drawn by the meter should ordinarily be a straight line. But any variation in the factors of production, such as the depreciation of any part of the machinery, a change in the temperature of the brine, water, etc., or the alteration of any other detail, at once changes the power demand, which is noted by the meter. An investigation is immediately made as to the cause of the variation, and correction is applied as soon as possible. Thus the efficiency of the plant is kept maximum at all times.

The use of a synchronous motor, instead of an induction motor for this installation, is in line with the present tendency in refrigerating engineering practice. The synchronous motor is favored because of its high efficiency, uniform speed, and ability to improve the power factor of the electrical system in the plant; and an ammonia compressor is well adapted to be driven by this type of motor, because, with the use of by-passes, the starting conditions are light and the speed is constant.

At the Sheffield Farms plant 110 tons of ice are produced daily from purified and filtered city water.

Electric Rivet Heater

The Berwick electric rivet heater, first built six years ago to improve their own shop conditions by the American Car & Foundry Company, 165 Broadway, New York City, has been greatly improved,



Berwick Electric Rivet Heater

being now built in ten types. It is simple, portable, absolutely safe and practically fool-proof. It gives a hot rivet in 30 seconds; heats 100 pounds of any size rivets in 20-kilowatt hours; the heating costs are reduced from 25 percent to 65 percent, and it reduces rivet loss to less than one-half of 1 percent; eliminates smoke, gas dirt and intense heat, and provides uniformity of heat, radiating from the center outward.

It is built with one, three or five electrodes, the five-electrode heater having a capacity of over 450 an hour, if required. It heats rivets 5/8, 3/4, 7/8 and 1-inch diameter up to 4½ inches long or longer.

NEW CONRADSON PLANT

Machine Tool Concern Includes Joseph T. Ryerson & Son

Announcement has recently been made of the incorporation of the Conradson Machine Tool Company, of Green Bay, Wis., of which Mr. C. M. Conradson is president. Mr. Conradson is well known in the machine tool field, at one time being associated with the Gisholt Machine Company, of Madison, Wis., and later being engaged in general consulting work in tool design.

The new concern is associated with Joseph T. Ryerson & Son, who will market the complete outfit of the new plant, consisting of plain and universal milling machines, selective head lathes, planers and radial drills. "Ryerson-Conradson" is the trade name under which these machine tools are being sold. The new line embodies radical departures from present designs of similar machines, and the new features aim to fill present-day heavy-duty production requirements.

Ground was broken for the Conradson Machine Tool Company plant in the spring of 1918. The building has recently been completed, equipment installed and production is now under way.

The initial unit of the proposed plan of buildings consists of machine shop and main erecting bay, both of saw-tooth construction, a power house and heating plant and office building. The erecting bay is served by a Pawling & Harnischfeger 10-ton crane. The machine shop equipment is modern in every respect, and consists chiefly of individual motor-driven machine tools. The equipment includes Ryerson-Conradson planers, radial drills, milling machines and selective head lathes; Brown & Sharpe and Hald grinders; Brown & Sharpe, Bilgram and Fellows gear cutting machines. The small tool equipment is especially complete, and includes Johannson gages and internal and external micrometers. The tool room equipment consists of the same modern type of tools, and is complete in every respect.

Joseph T. Ryerson & Son, the selling representatives, have been in business for more than seventy-five years, and during the past several years have been making large expansions in the machinery division of their business. They have steel and machinery warehouses at Chicago, St. Louis, Detroit, Buffalo and New York, with district offices in practically all of the larger cities, and maintain agents and direct representatives throughout the world.

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"LOOK"

HARD TO BELIEVE, ISN'T IT?
BUT THIS IS AN

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IMAGINE

What would have happened to a cast iron or semi-steel propeller under similar conditions.

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BUSINESS NOTES

Barclay, Parsons & Knapp announce the change in the firm name to Parsons, Klapp, Brinckerhoff & Douglas, the personnel of the firm remaining unchanged.

Mr. George L. Washington, of the negotiation division of the Westinghouse Electric International Company, has left East Pittsburg for Cuba, where he will be located as salesman in the Havana office of the company.

The St. Louis sales office of the Standard Underground Cable Company, Mr. E. J. Pietzcker, manager, was on February 1 removed from the Security Building, where it has been located since 1897, to the Arcade building.

Mr. A. S. Winter, formerly connected as advertising and sales manager with The William Powell Company, has joined the sales force of The Fairbanks Company, Pittsburgh, Penn., and will represent them in Southern Ohio.

William F. Brady has resigned his position as superintendent of the boiler shop of the Edward Renneburg & Sons Company, Baltimore, Md., to become superintendent of the tank and stack department of the Erie City Iron Works, Erie, Pa.

Mr. J. F. Paige has been made operating manager of the Halifax (N. S.) Shipyards, Ltd., a subsidiary of the Canada Steamships Company. Mr. Paige was formerly with the Port Arthur (Ontario) Shipbuilding Company as general manager.

Mr. Irving H. Jones, who is well known in machine tool circles in the Chicago field, has become associated with the machinery department of Joseph T. Ryerson & Son, and will specialize in sales engineering work on the Ryerson line of machine tool equipment.

Mr. I. F. Baker, of the Westinghouse Electric International Company, who has been located in the New York office of that company for the past two years, is on his way to Tokio, Japan, where he will act as a special representative of the Westinghouse International Company.

It has recently been announced that "A. W. P." electrodes, produced by the Alloy Welding Processes, Ltd., 14-16 Cockspur street, London, S. W. 1, have been approved by Lloyd's Register of Shipping and by the British Corporation for the Survey and Registry of Shipping.

H. A. Lacerda, for some time past connected with the boiler inspection departments of the Federal Shipbuilding Company, Kearney, N. J., and the Morse Dry Dock & Repair Company, Brooklyn, N. Y., has assumed his former connections with the Erie Railroad in the shops at Jersey City, N. J.

Mr. Arthur Elliot Allen has been appointed district manager at New York for the Westinghouse Electric & Manufacturing Company, to succeed Mr. Edward D. Kilburn, who has been elected vice-president and general manager of the Westinghouse Electric International Company.

Frederick William Renshaw, president of the Globe Seamless Steel Tubes Company, Chicago, Ill., died February 1 of pneumonia at his home in Evanston, Ill. Mr. Renshaw was born in Chicago, February 26, 1880. He was a graduate of Harvard Preparatory School and Sheffield Scientific School.

Mr. William R. Gummere, who for a number of years represented the Independent Pneumatic Tool Company in Cleveland, Ohio, has again become affiliated with that company. Mr. Gummere will be connected with the Pittsburgh branch, which is under the management of Harry F. Finney.

Mr. John T. Dillon, president of the Titusville Forge Company, Titusville, Penn., formerly Titusville plant of the Bethlehem Steel Company, has announced the opening of a Pittsburgh sales office in charge of Mr. C. W. Forcier, 433 Union Arcade, Pittsburgh, Pa., and their New York office in charge of Atkinson & Utech, Inc., 111 Broadway, New York City.

In order to obtain closer co-operation between the factory and sales department, the Electrolabs Company announces the consolidation of all offices at 2635 Penn avenue, Pittsburgh, Pa. The request is issued by the company that all future correspondence be addressed to the Pittsburgh office. A branch office will be maintained at Room 313, 30 Church street, New York City.

The College of Engineering of the University of Illinois, Urbana-Champaign, announces the appointment to its staff of instructors of Matthew Riddell, Jesse Benjamin Kommers, Floyd Hamilton Fish, Elmer Newman Bunting, Roswell Miller Rennie, Oscar William Schricker, Louise Marie Woodroofe, Ezra Edward Bauer, Clarence Carl Schmidt, Ralph Douglas Doner and Enoch G. Bourne, since the beginning of the academic year in September.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Penn., has announced the appointment of Alexander Taylor, for many years manager of works, as assistant to the vice-president, to have general charge of production, stocks and stores. R. L. Wilson has been promoted from the position of general superintendent to works manager of the East Pittsburgh plant. E. R. Norris has been appointed director of works equipment, in charge of machinery, tools and methods in the various plants.

The following appointments of sales representatives have been made by the Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio: New York, Charles Hubbard & Company, 81 Fulton street; Chicago, Warren Corning & Company, Transportation building; St. Louis, Certes Supply Company, 'Frisco building; Atlanta, Spalding & Small, 1010 Hurt building; Philadelphia, Read - Rittenhouse Company, 1234 Commercial Trust building; San Francisco, Berger-Carter Company, Tenth and Mission streets; Seattle, A. M. Castle & Company of Washington; Boston, Austin & Doten, 102 North street.

Edward D. Kilburn, who since March 15, 1917, has been New York district manager of the Westinghouse Electric & Manufacturing Company, was recently elected vice-president and general manager of the Westinghouse Electric International Company. Maurice Coster, who has for more than thirty years handled the foreign interests of the Westinghouse Company, continues as vice-president of the International Company. The president of the International Company is Loyall A. Osborne, who is senior vice-president of the Electric Company, and was actively engaged in national work during the war.

When the Manufacturers' Aircraft Association holds its second annual Aeronautical Exposition at the Seventy-first Regiment Armory, Thirty-fourth street and Park Avenue, New York, in March, 1920, the public will have an opportunity to see what American designers have accomplished in developing commercial airplanes—planes for private use, for sporting or touring purposes, or long-distance transportation of freight and mail. The larger planes have a carrying capacity of from three to six thousand pounds, and, driven by three or four motors, will cover half the distance across the United States in a single flight. The cost of operating airplanes has been reduced during the last year from the almost prohibitive figure of one or two dollars a mile, until now it compares favorably with motor trucks and railroads.

The Champion Rivet Company, Cleveland, Ohio, announces the appointment of George W. Denyven, of Boston, as New England agent. Mr. Denyven has been identified with the iron and steel industry in its various branches for many years. His first experience in boiler work was obtained with Edward Kendall & Sons, Cambridge, Mass. Later, in South Africa, he was employed as a boiler maker and inspector by the Central South Africa Railroad. For a few years he traveled through Australia, New Zealand, Honolulu, and then to San Francisco, where he located in the boiler shops of the Santa Fe Railroad. At different periods he has been connected with the Pacific Hardware & Steel Company; A. C. Harvey Company, Boston, Mass., and during recent years with E. P. Sanderson Company, Cambridge, Mass., whom he will continue to represent in connection with the Parkesburg Iron Company, Parkesburg, Pa.; Rome Iron Mills, New York; The Pollak Steel Company, Cincinnati, Ohio; The Locomotive Firebox Company, Chicago, Ill., and the Champion Rivet Company. The Boston offices are at 141 Milk street.

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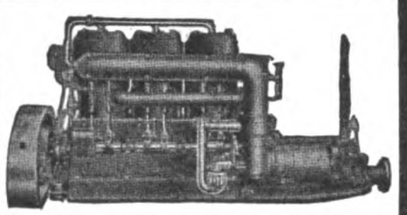

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of Motorboats, Yachts and Barges

There will be sold by sealed proposals, receivable at the bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12:00 o'clock noon, 6 March, 1920:—

Motorboat DAIQURI S. P. 1285, Motorboat PATROL No. 6 S. P. 54, Steam yacht PAWNEE S. P. 699, Steam yacht ACTUS S. P. 516, Coal barge BESSIE S. P. 1919, Motor patrol HUPA S. P. 650, Tug WINTHROP S. P. 3297, Steam Yacht ADMIRAL II S. P. 967, now in the First Naval District, Navy Yard, Boston, Mass.

Motor yacht PARTHENIA S. P. 671, Steam yacht NAUSHON S. P. 517, Steam yacht MARGARET S. P. 527, now in Third Naval District, Fleet Supply Base, Brooklyn, N. Y.

Steam yacht VEGA S. P. 734, now in the Fourth Naval District, Navy Yard, Philadelphia, Pa. Tug FEARLESS S. P. 724, now in the Fourth Naval District, Navy Yard, Philadelphia, Pa.

Motorboat NERITA S. P. 3028, Motorboat SEA GULL S. P., 223, Motorboat MAGGIE S.P. 1202, now in the Fifth Naval District, Naval Operating Base, Hampton Roads, Va.

Motorboat RUSS S. P. 1151, Motorboat HETMAN S. P. 1150, now in the Seventh Naval District, Naval Station, Key West, Fla.

Motor Patrol boat WILROSE II S. P. 195, now in the Sixth Naval District, Peoples Office Building, Charleston, S. C.

Steam yacht SISTER S. P. 822, now in the Eighth Naval District, Building No. 8 Naval Station, New Orleans, La.

Exact location may be ascertained from the Commandant of the district concerned, and should be obtained before making trip for inspection. Sales will be for cash to highest bidders. Ten per cent deposit required with bid. Right to reject all bids reserved. Catalogs of Sale and full information concerning the vessels, and the terms of sale, obtainable from the bureau of Supplies and Accounts, or Commandants of the above districts. JOSEPHUS DANIELS, Secretary of the Navy, 1-26-20.

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OBITUARY

JOSEPH M. FLANNERY

Joseph M. Flannery, president of the Standard Chemical Company, died a few days ago at his home, 149 North Dithridge street, Pittsburgh, Penn. Mr. Flannery had been in poor health for many months. He was a lifelong resident of Pittsburgh, born there July 18, 1867.

He had been instrumental in the organization of a number of enterprises, among which were the Meadow Lands Coal Company, the Flannery Bolt Company, the American Vanadium Company, the Standard Chemical Company, and the Rosanoff Process Company.

To Mr. Flannery is due the introduction of vanadium in the steel industry, marking an epoch in steel making. Convinced of the value of vanadium for this purpose, he went to South America, where he secured the world's largest vanadium deposit. Through his interest in vanadium, Mr. Flannery's attention was called to an ore occurring in Colorado which contained radium.

Having heard of the possible use of radium in the treatment of cancer, he determined to undertake the production of radium. In 1911 he organized the Standard Chemical Company, and this pioneer company is to-day the world's largest producer of radium. Mr. Flannery leaves his widow, Mollie Gearing Flannery, one daughter, Miss Helen K.; three sons, Joseph M., Jr., John and Raymond, and one brother, J. J. Flannery.

HAROLD MCGILL DAVIS

Harold McGill Davis was born in Jerseyville, Ill., on August 26, 1860, the son of Samuel W. and Mary J. McGill Davis. His early boyhood was spent in Kansas, where his father was treasurer of the town of Paola, to which he was elected thirteen consecutive years. Harry, as he was called by his friends, had a public school education, finishing in the St. Louis High School, after which he became office boy in a lead and oil factory. While in high school a cadet corps was organized, and afterward mustered into the 2d Regiment of the National Guards of Missouri. He became a second lieutenant, and was a member of a picked squad which gave exhibition drills and fancy evolutions. Leaving the lead and oil company he was appointed chief clerk of the St. Louis United States Assay Office by President Chester A. Arthur. Finding a government position too slow and uncertain, he came to New York to study architecture. Being active in church work he was elected president of the Brooklyn Christian Endeavor Union in 1901, and the next year was chairman of the printing committee in connection with the Christian Endeavor Convention held in Madison Square Garden. The financial panic of 1893 offered him a chance to get into the advertising profession, and for four years he was advertising manager of a trade paper in New York. Then he joined an advertising agency, thus fitting him for the position of manager of the advertising department of the Sprague Electric Works of the General Electric Company, which he obtained in December, 1899.

His ability as a writer and designer gave him an advantage over other solicitors which publishers were quick to recognize, and resulted in the formation in leading publishing plants of what is now known as the Service Department. Aside from his advertising he frequently contributed to papers poems, both religious and humorous, and descriptive articles.

ALBERT SCHMID

In the death of Albert Schmid, which occurred in New York on December 31, 1919, the engineering world has suffered a great loss. Mr. Schmid was not only closely identified with the early development of electrical machinery in the United States, but was also prominent in the electrical world of France, Switzerland, Italy and Great Britain. Mr. Schmid was born in Zurich, Switzerland, in 1857, and received his education in that city. He began his real career by entering the employ of the French Westinghouse Air Brake Company. Coming to America, Mr. Schmid turned his attention to design work for the Westinghouse Air Brake Company, then located at Allegheny, Penn., later becoming chief designer for the Union Switch & Signal Company. In 1886 he was transferred to the Westinghouse Electric Company as chief engineer, and in 1896 became its general superintendent. On the formation of the French Westinghouse Company he was made director general of that organization. He had also held the positions of director of the Westinghouse Electric Company, Ltd., of England, president of the Compagnie des Lampes à Filament Metallique, of France, and at the time of his death, in addition to being consulting engineer for the American Westinghouse Company, he represented the Westinghouse Lamp Company and had general supervision of its interests abroad.

EVARTS SHANKIN BARNUM

Evarts Shankin Barnum, of the G. M. Basford Company, 30 Church street, New York City, died at his home in Ridgewood, N. J., on February 3, after an illness of eight days. Mr. Barnum was born in Louisville, Ky., in 1883, and received his education at Purdue University, graduating in 1906. Immediately upon his graduation he entered the service of the Pennsylvania Lines West as apprentice, and worked successively as apprentice, machinist, foreman, general foreman, roundhouse foreman and motive power inspector. Leaving the railroad in 1917 he joined the staff of the *Railway Age* as associate editor, and later later became associated with the G. M. Basford Company, in charge of the copy department.

Mr. Barnum endeared himself to all with whom he came in contact. His even and pleasing disposition, and his desire to "help the other fellow," made a friend of everyone he met. He is survived by his wife and two children.

FREDERICK HOLBROOK

News of the death in Paris of Frederick Holbrook, vice-president of the American International Shipbuilding Corporation, and builder of the Hog Island yard, has been received. He had been ill only a short time, having left New York last December to visit Russia in the interests of the Grace-American International Corporation, of which he became president at its formation last year, to do business in Russia. In 1916 he went to Russia in the interests of the American International Shipbuilding Corporation, soon after becoming vice-president, and remained a year. During 1918 he had charge of Hog Island as president of the corporation. He was president of the Holbrook, Cabot & Rollins Corporation, of Boston, which constructed buildings, railroads and dry-docks in the United States and Mexico. Mr. Holbrook was born in Lynn., Mass., 59 years ago.

EDMUND MILLS

Edmund Mills, engineer in the marine department of The Babcock & Wilcox Company, died January 26, 1920. Mr. Mills was born in Jersey City, N. J., February 15, 1864. He was educated in the public schools of Jersey City, served an apprenticeship as a machinist and worked a short time at that trade. He was in business for himself a short time, and later was with an electric corporation.

Somewhat more than twenty-five years ago he entered the marine department of the Babcock & Wilcox Company as a draftsman, and continued in that department all the rest of his life. He was chief draftsman of the marine department for a number of years, and about twelve years ago was transferred to the marine department of the general office as one of its engineers. He had educated himself so that he was an expert on the production and use of steam, and was an engineer of unusually fine mechanical judgment. He was very much interested in the subject of Arctic exploration, and had collected a library of Arctic literature which is probably one of the best possessed by any individual. He was also an amateur astronomer.

He was a man of very attractive personality, high integrity and absolute loyalty. By his death The Babcock & Wilcox Company has lost one of its oldest and most efficient employees, and his associates a friend whom it will be hard to replace.

Mr. Mills was a member of the Society of Mechanical Engineers, Society of Naval Architects and Marine Engineers, and the American Society of Naval Engineers. He leaves a wife and a son, who is also an engineer.

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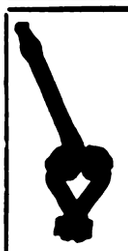
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Marine Draftsman—Large shipyard in vicinity of New York has openings for the following men: Turbine Designer, preferably man with experience in designing Parsons turbines; Marine Steam Engine Designer; Engine, Pipe and Electrical Draftsman; technical graduates preferred. Positions permanent, with excellent opportunities for advancement. Address *Box* 798, care of MARINE ENGINEERING.

GOVERNMENT PLACES

The United States Civil Service Commission announces competitive examinations on March 16, 1920, for PETROLEUM ENGINEER, $3,000 to $4,500 a year, and ASSISTANT PETROLEUM ENGINEER, at $2,100 to $3,000 a year. Vacancies in the Bureau of Mines, Department of the Interior, for duty in Washington, D. C., or in the field, at the salaries indicated, and in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from these examinations, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer or promotion. The entrance salary, within the range stated, will depend upon the qualifications of the appointee and the importance of the duty to which assigned. Applicants should at once apply for Form 2118, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.; the Secretary of the United States Civil Service Board at any place where there is a Civil Service office.

On March 17, 1920, there will be an examination for AUTOMATIC SCALE EXPERT. A vacancy in the Customs Service, New Orleans, La., at $1,600 a year, and vacancies in positions requiring similar qualifications throughout the United States, at this or higher or lower salaries, will be filled from this examination. Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commision, Washington, D. C., or to the secretary of the United States Civil Service Board at any place where there is a Civil Service office.

On March 23, 1920, extminations will be held for FOREMAN, HEAT TREATMENT OF ARMOR PLATE, $10 to $14.40 a day, and FOREMAN, HEAT TREATMENT OF LARGE GUNS, $8 to $12.56 a day. Vacancies at the U. S. Naval Ordnance Plant, South Charleston, W. Va., at the salaries indicated, and in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from these examinations, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer or promotion. Certification to fill the higher-salaried positions will be made from those attaining the highest average percentages in the examinations. As difficulty has been experienced in securing eligibles for these positions, qualified persons are urged to enter these examinations. For these positions at the Naval Ordnance Plant male eligibles are desired. Applicants should at once apply for Form 1371, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C., or to the secretary of the United States Civil Service Board at any place where there is a Civil Service office.

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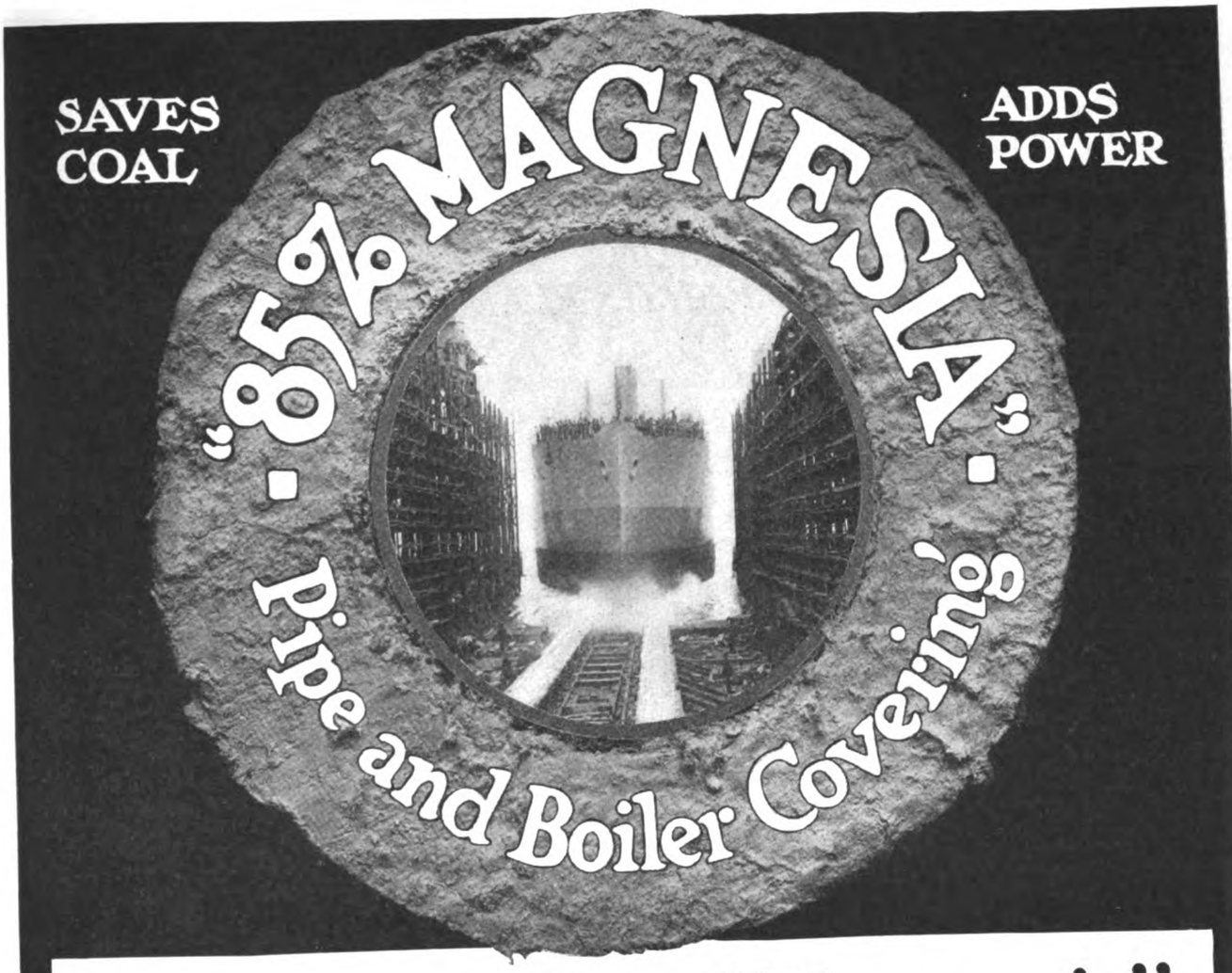

The Good Ship "Magmeric"

Up there you see the 8700 ton "*Magmeric*" built by the U. S. Shipping Board, at Hog Island, slipping down her ways.

Why that peculiar name, given at her christening?

"*Magmeric*" is a contraction of the words "Magnesia Association of America." It was given to this ship by the Shipping Board in courteous appreciation of the vast war output of "85% Magnesia" Pipe and Boiler Covering for insulating the steam of the Government Ships, as well as for other Government work, made by the Member Companies of that Association.

For over 30 years the U. S. Navy has specified "85% Magnesia" steam pipe and boiler coverings for its ships. When war came the U. S. Shipping Board followed suit. "85% Magnesia" pipe and boiler coverings insulated the steam lines of the large munition factories, "85% Magnesia" service blocks protected the steam of the U. S. locomotives made for transport in France.

It was therefore a gracious recognition by the Shipping Board of the dependable service of the Magnesia Association members to christen one of its fleet with this symbolic name.

"85% Magnesia" steam pipe and boiler covering, when properly applied and of correct thickness, defies steam and water leakage. It is proof against vibration. It saves enough coal to pay for its own cost every few months. It will remain in efficient service longer than the metal it covers,—as witness the unimpaired condition of the "85% Magnesia"—coverings taken off the old "St. Paul" when she capsized at her dock—coverings that had been in service for 25 years.

Write for Standard Specification AA showing the correct thickness and application of "85% Magnesia" coverings for every condition of service.

MAGNESIA ASSOCIATION *of* AMERICA, 721 Bulletin Building, Philadelphia, Pa.

Executive Committee, W. A. Macan, *Chairman*
George D. Crabbs, The Philip Carey Co., Cincinnati, Ohio.
Alvin M. Ehret, Ehret Magnesia Mfg. Co., Valley Forge, Penn.
J. R. Swift, The Franklin Mfg. Co., Franklin, Penna.
Richard V. Mattison, Jr., Keasbey & Mattison Co., Ambler, Penna.

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General News and Technical Notes

$3,000,000 ADDITION TO SUN SHIPBUILDING COMPANY'S PLANT

Big Drydock, With Wet Dock, Ways and Shops, To Be Built at Chester, Pa., Plant

The Sun Shipbuilding Company announced a few days ago that it is to construct a 600-foot drydock at its plant in Chester, Pa. The dock will be of the graving type, the only one of its kind on the Delaware River, and will cost with other improvements planned about $3,000,000. A wet dock 600 feet by 200 feet, and capable of handling three ships, will also be built, as will three additional ways, of which the company at present has six. The company has two wet docks now able to handle six ships at the same time. Only work on the outside of the ship below the waterline has to be done in a drydock, and the vessel can then be transferred to a wet dock for other repairs. The company plans to build several additional shops in connection with the drydock, and will also make an addition to its general office building.

Work on the new projects will start within thirty days, and it is expected it will be completed before the beginning of next winter.

John G. Pew, president of the company, says: "The improvements will cost about $3,000,000, and we will be able to build ships up to 20,000 tons on the new ways. Ships on the present ways range from 10,500 to 12,000 tons." He adds that the Sun Shipbuilding Company is the only concern interested in the improvements. The Sun Company, an allied oil corporation, has a fleet of ten tankers and several barges, and Mr. Pew says that, from the Sun Company and allied organizations and privately owned vessels, there will be plenty of work for the new plant for an indefinite period after the proposed additions are completed.

TO TRY DIESEL ENGINES

American-Hawaiian Orders Two 11,000-Ton Freighters

One of the most interesting shipbuilding contracts recently placed is one by the American-Hawaiian Steamship Company, 8 Bridge street, New York, for two 11,000-ton shelter-deck freighters, to be built by the Merchant Shipbuilding Corporation, at its Chester, Pa., yards and equipped with Burmeister & Wain Diesel engines, built by the William Cramp & Son Ship & Engine Building Company, of Philadelphia, which has the commission to build the Scandinavian company's engines in this country. The freighters are to have a speed of about 11 knots.

The decision of the American-Hawaiian Company to try out the Diesel engines has caused much comment in American shipping circles, for reports from abroad say that the Diesels can be operated much more cheaply than steamers with either reciprocating or turbine engines.

Big Contract for Tankers

The Merchant Shipbuilding Corporation, Harriman, Pa., it is announced, has taken a contract for the construction of six steel tankers, each of 12,000 tons rating, to cost about $11,250,000 total. This order assures the yard of continuous operation for about one year after the completion of Government contracts, or until October, 1921. The company has also secured contracts for six additional vessels to be built at its Chester works.

ORDERS FOUR TANKERS

Union Oil Company, of Delaware, to Have Big Ships

Four modern steel tankers, which total 46,000 deadweight tons capacity, have been contracted for by the Union Oil Company, 120 Broadway, New York. Two of 12,500 tons each—85,000 barrels capacity—are to be delivered in March, 1921, by the Sun Shipbuilding Company, Chester, Pa. Two of 10,500 tons each—75,000 barrels capacity—have been contracted for through W. A. Harriman & Company, Inc., 165 Broadway, New York, to be delivered in November and December, 1920, by the Merchant Shipbuilding Corporation, Chester, Pa. Each of the 12,500-ton vessels will be equipped to carry about 3,500 tons of package cargo on return voyages.

These contracts place the Union Oil Company of Delaware well up in the list of the large oil companies which have tankers building or under contract in American shipyards. Planning tankers for carrying return cargoes to this extent is a development of an idea which has until now only been tried on a smaller scale.

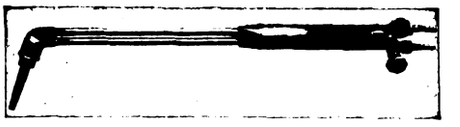
Planning a "Seagoing Fair"

The Export and Import Board of Trade management of Baltimore is considering a trade-boosting scheme of floating a "seagoing fair," equipping a vessel with Baltimore products and sending it on an extended cruise. A force of exhibitors would accompany the ship and boost Baltimore and her export and import facilities.

New Welding Torch

A welding torch, having various refinements of design, has recently been produced by the Air Reduction Sales Company, 120 Broadway, New York city. It is claimed that this torch increases the efficiency of the welding flame, although effecting the maximum economy in gas consumption.

The general design has been improved particularly in the construction of the



New Type Welding Tank

valve handles and hose connections. For convenience the gas pressure table has been rolled on the upper part of the handle. The valve handles are octagonal, and arranged on the left side of the torch where they will not catch in the operator's clothes.

The tubes are of hard-drawn seamless brass, countersunk at both ends, while the valve body and the butt of the handle are combined in a single casting instead of being screwed together as is the usual practice. Threads on the tip have been eliminated by the use of a tip nut to prevent gas leakage. Heads and tips of various types, available for use with the different sizes of torches, make the equipment adaptable to all classes of welding from sheet metal to castings.

Radiant Company Has New Advertising Manager

The Radiant Manufacturing Company, of Sandusky, Ohio, whose output the last two years has been entirely taken by a small number of large jobbers, will soon inaugurate a vigorous advertising campaign to dealers and farmers—a liberal appropriation having been set side for this purpose. Mr. A. H. Ambrose, for the past eight years assistant advertising and sales promotion manager for the Associated Manufacturers' Company of Waterloo, Iowa, has been secured as manager of the campaign. He is the one responsible for the sales work which made the "Jerry-Boy" hand-car engines so indispensable to section foremen all over the country, and has had wide experience in the manufacture and sale of farm lighting plants.

Mr. Ambrose states that the Radiant is the only complete single unit lighting plant on the market selling for less than $400 with batteries, and expresses his confidence in the 1920 sales being trebled over 1919 production.

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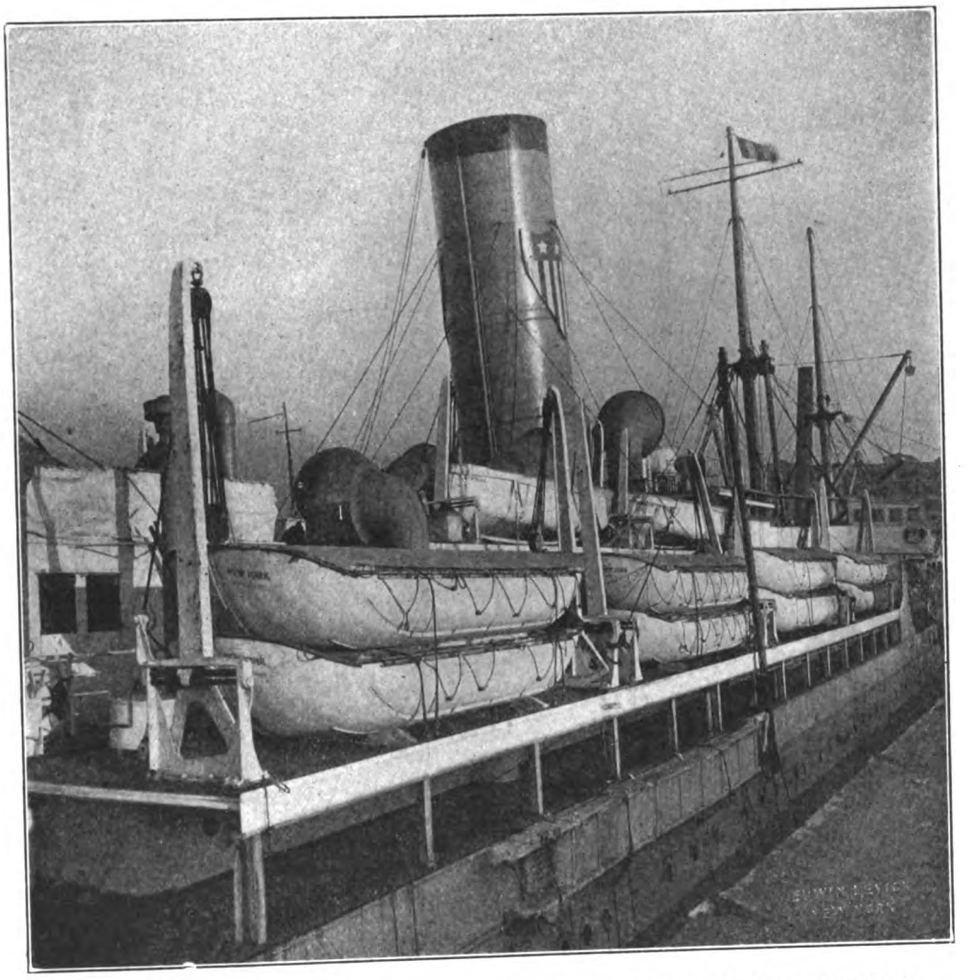
SAFETY AT SEA



THE U. S. S. SUSQUEHANNA

COMPLETE OCEAN GOING EQUIPMENT:

Welin Quadrant Davits
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Mills Releasing Gears
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MACHINE TOOLS SATISFY

Factory Managers Write To Government Officials

The director of sales of the War Department announces two successful sales of machine tools recently concluded between the Government and the La Fayette Motors Company, of Indianapolis, Ind., and the Austin Manufacturing Company, of Harvey, Ill. In a letter to Mr. Guy Hutchinson, first assistant director of sales, Mr. D. C. Selheimer, factory manager for the La Fayette Motors Company, says:

"We are glad to inform you that we have this date completed negotiations with the Cleveland office in the matter of securing the two Natco Multiple Drills, Nos. 154 and 156. Our certified check for $5,450, together with shipping instructions, is being forwarded this date to the Cleveland office, and we trust there will be no unnecessary delay in making shipment. All previous machines purchased from the Government have been received in good condition. We wish to take this opportunity to thank you for all past favors to us in the matter of securing machinery, and to assure you that we fully appreciate your efforts."

The two Natco Multiple Drills referred to were purchased from the Ordnance Salvage Board through the district office at Cleveland. The other machines to which reference is made consisted of 41 machine tools, mostly lathes and milling machines, which were purchased from the Air Service, the price paid being $36,394.

Mr. W. G. Morse, factory manager for the Austin Manufacturing Company, speaks of the satisfactory service rendered by the Government in a letter to the office of the Director of Sales. He says:

"This will acknowledge your letter of December 24, which I have delayed a long time in answering. You will be interested in knowing how we came out in our purchase of machine tools, and I am pleased to advise that in all cases all of the machinery purchased was received here in first-class condition, properly packed and properly slushed, and I wish to thank yourself and the other men whom I met in connection with this proposition for the interest and courtesy which they displayed in all of our dealings."

Pensacola Dock Progressing

The third pontoon of the floating dock being built for the Bruce Dry Dock Company, Pensacola, Fla., was successfully launched on February 7. Indicators on the pontoon showed no measurable deflection during the launching. It is believed that the construction of this pontoon establishes a world's record, it being built and launched 39 days and 6 hours from the time of laying the first timber. This floating dock is of the Crandall longitudinally-trussed sectional type.

The dock is being constructed by the Aberthaw Construction Company, under the supervision of Paul H. MacNeil, resident engineer for The Crandall Engineering Company, Dry Dock Engineers, East Boston, Mass.

WESTINGHOUSE IN HAVANA

J. W. White, Electrical Engineer, in Charge of Cuban Office

The Westinghouse Electric International Company have opened a new office in the Royal Bank of Canada building, Aguiar and Obrapia streets, in Havana, Cuba. This was found necessary because of the growing use in sugar mills and other enterprises in Cuba of Westinghouse electric equipment. To form a closer relation with existing installations, and to be of the fullest service wherever knowledge, training and skill can be useful in electrification, will be the object of the force in the new office.

Mr. J. W. White, who has been located in Cuba for some time past as Westinghouse representative, will be in charge of the new office. Mr. White's intimate knowledge of and close relation with the industries in Cuba peculiarly fits him to cope with all the problems that may be encountered. He will be ably assisted by other special engineers, and this, with the convenient location of the new office, will give to the many customers, friends, and to others interested in any form of electric development, a confidence which emanates from a first-hand knowledge of the good qualities and reliability of Westinghouse apparatus.

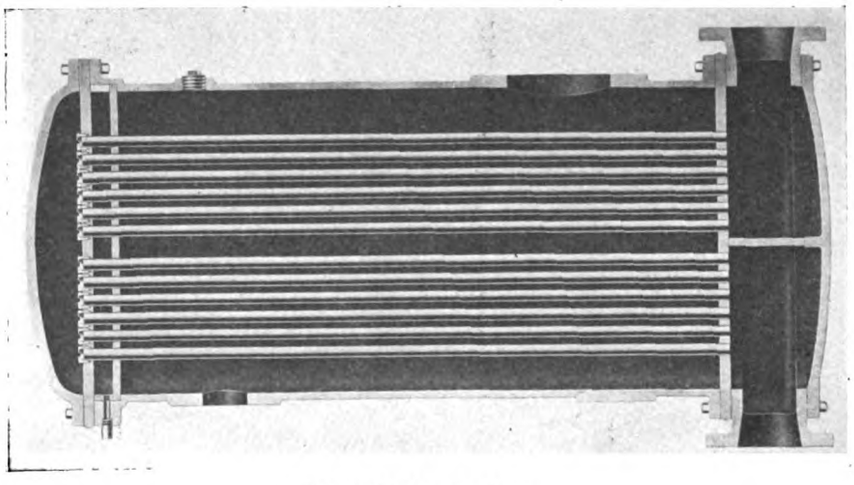
A complete stock of catalogues and other descriptive matter will be maintained in the new office, where for the asking can be obtained complete information on everything electric, from an electric iron or fan to the powerful steam turbine generators or electric locomotives.

National Marine Week Exposition, Grand Central Palace, Lexington avenue and Forty-sixth street, New York, April 12-17, 1920

New Wheeler Condenser

It was recently brought up at a meeting of marine engineers that most of the ships now in service are experiencing trouble with leaky condensers. These leaks have been almost invariably traced to the stuffing box between the tube and the tube plate. It has been found that in spite of the kind of packing used some leakage is practically unavoidable, due to the expansion and contraction of the tubes with temperature changes.

The illustration herewith shows a new type of condenser developed by S. Morris Lillie. This condenser is used chiefly in connection with salt circulating water on board ship, or in regions where the water used for circulating purposes would be bad for boiler feed in case of leakage into the condenser and the consequent mingling of the bad water with the condensate.



New Wheeler Condenser

The tubes are tightly expanded into the right-hand tube plate, in order to eliminate the possibility of leakage at this end. At the other end the tubes are provided with the standard ferrules and condenser packings. At the left end of this condenser a thin auxiliary tube plate or baffle is provided, through which all of the tubes are passed. The holes in this plate are of such size as to make a sliding fit with the tubes. It is obviously not necessary that these joints be absolutely watertight.

In case of leakage of circulating water through the ferrules and packing, such leakage immediately drops down to the bottom of the compartment between the two tube plates, and is then carried off by the drain shown at the bottom, to which is attached either a small direct-acting condensate pump, or a vacuum trap, depending upon conditions.

We are advised by the manufacturers, The Wheeler Condenser & Engineering Company, Carteret, N. J., that all sizes of this condenser (known as Type 3) are now available at a cost but slightly in advance of standard types.

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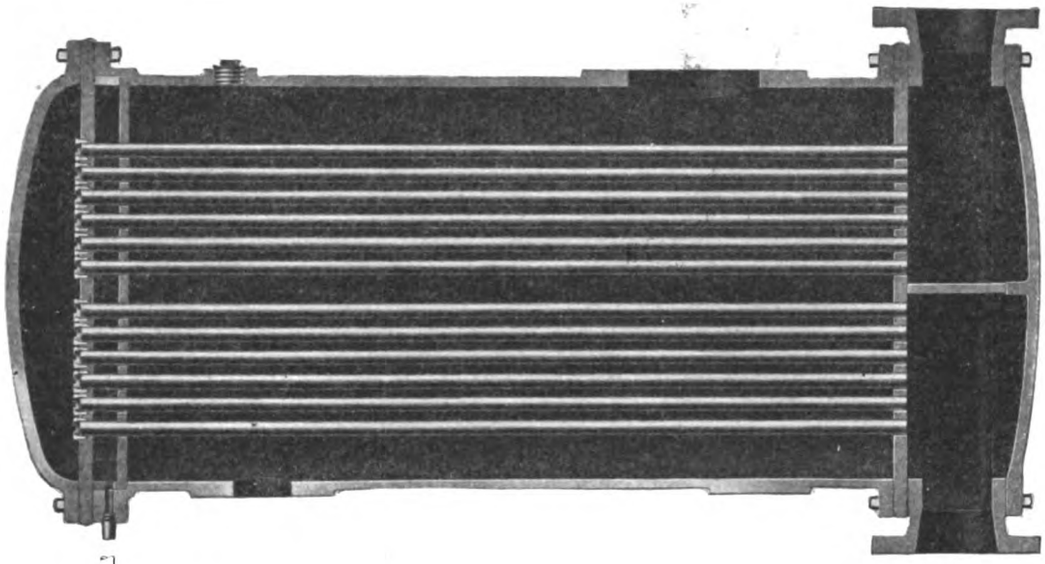
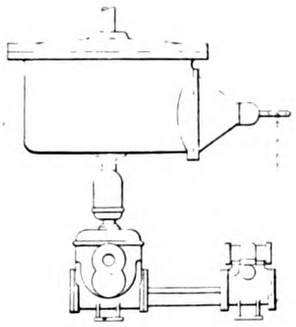
ANNOUNCEMENT!

A NEW WHEELER CONDENSER WHICH ELIMINATES LEAKAGE TROUBLES





Full Information on Request

Note the patented baffle wall shown at the left end, through which the tubes make a "sliding fit."

The tubes are expanded into the tube plate at the right end, hence there can be no leakage there. At the left end, however, packing must be used. Provision must always be made for expansion and contraction due to temperature change. With this expansion, contraction, and consequent sliding, some leakage is liable to occur.

Salt water is decidedly troublesome in boiler feed. Hence the patented Wheeler baffle.

Even if the salt circulating water leaks through the packing it cannot get past the baffle and mingle with the condensate.

Leakage water is trapped or pumped away separately.

WHEELER CONDENSER & ENGINEERING CO.,

CARTERET, N. J.

Manufacturers of condensers; circulating pumps; Wheeler Crescent Brand seamless drawn brass, copper and special mixture tubing; evaporators; distillers;—everything in the condensing and evaporating line for use on board ship.

70

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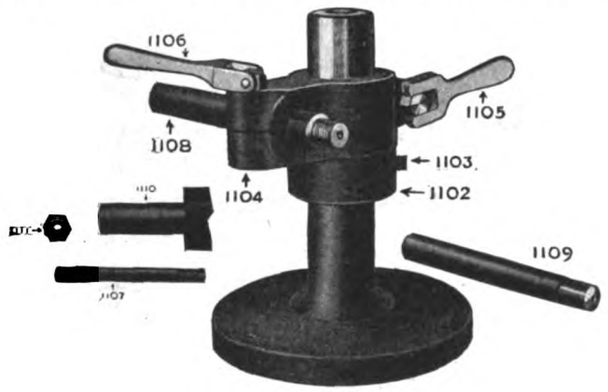
Assembling and Repairing Pneumatic Tools

An entirely new device for facilitating the handling of pneumatic tools while they are being assembled or repaired has been produced by the Independent Pneumatic Tool Company, Chicago, Ill.

The device is called the "Universal Assembling and Repair Vise," and consists of a flanged upright machine post or stand, having a sliding stop collar which will quickly adjust the device to the proper height for convenient working. Directly over the collar is a clamp swiveling on it. The collar may be held in any



Universal Assembling and Repair Vise

position by tightening a quick-action clamp screw. At the other end of the clamp is a hole in which stems having ½-inch and ¾-inch pipe threads are engaged. For small size drills ⅛-inch pipe threads are used in connection with the stem support.

In operating the device, the sliding collar is first adjusted to the desired height and the proper size stem support required for the drill to be repaired is inserted. If a large drill is to be repaired it is screwed in place at the dead-hand hold, but if work is being done on drills of small size the top clamp screw must first be tightened, then the stem inserted in the support and a nut screwed on the short threaded end of the stem. This allows the long end of the stem to project through the support. The small drill may then be screwed on the stem at the dead-hand hold until it is tight against the formed square head of the stem support. The drill is then ready for repair.

When the top clamp screw is released it is possible to turn the drill in any desired position for inspection, reaming, lapping piston holes, removing the gear case, spindle, valve gear, connecting-up rods or adjusting, by a simple pull of the side clamp screw lever.

Record of De Laval Reduction Gears

The De Laval Steam Turbine Company, Trenton, N. J., reports that over one hundred De Laval marine reduction gears, ranging in capacity from 750 to 13,500 horsepower, are now in actual service and are reported to be very successful in operation. A number of these have been installed on vessels which have run over 100,000 miles. Not a single case of trouble has been reported. The action of the reduction gears is characterized by quiet operation, high efficiency and absence of wear.

CORDAGE FIRM GROWING

Whitlock Company To Have More Room and Power

The Whitlock Cordage Company, of Jersey City, N. J., has completed building plans involving an expenditure of more than $250,000. Contracts have been let to the John W. Ferguson Company, of Paterson, N. J., which include the erection of a four-story reinforced concrete building, an additional story to Building No. 9, and an addition to the power house.

The new building, which will measure 100 by 100 feet, is to be used for manufacturing purposes, and will accommodate 80 additional employees. The floors will be of maple, and the stairways of reinforced concrete. Provision for a lunch-room has been made on the third floor.

The additional story to Building No. 9 will be of heavy mill construction, and is planned to be 90 feet wide, 130 feet long and 15 feet high. The additional bay to the power house, measuring 20 feet wide, 54 feet long and 30 feet high, will be walled with brick, floored with brick and concrete, and reinforced with wood supported by steel trusses. Four new boilers, of 400-horsepower each, are to replace the present boilers of 200-horsepower capacity, and a new 500-kilowatt and another 1,000-kilowatt turbine are to be added to the engine room.

Sweden Needs Tankers

A report from Hamburg, Germany, says that Sweden is in need of tankers. A subsidy has been granted by the Commercial College of Stockholm, covering about two-thirds of the cost of two 6,000-ton steamers to be built, but these steamers will carry only one-third of the annual oil requirement of the country. The subsidy is 8,000,000 kroner.

How the "Gun" Tap Works

The Greenfield Tap & Die Corporation, Greenfield, Mass., has adopted a tap designed on the principle that a shearing or slicing cutting stroke embodies advantages not usually found in a tap.

In Fig. 1 it will be noticed that the cutting edges *A* at the point of the tap

Fig. 1

are ground at an angle *B* with an axis for a distance of three or four threads. This angle, in conjunction with the hook of the land and special flute form, produces a long, curling chip, Fig. 2, similar to that a well ground lathe tool turns

Fig. 2

up. As the tap progresses the chip is passed out ahead, from which fact the name "Gun" tap has been applied to the tool.

The flutes not being required for the passage of chips are particularly small, so that a large cross sectional area remains, giving the tap additional strength, Fig. 3. All of the cutting is done by the first few teeth, the rest of

Fig. 3

the thread acting as a lead screw to steady the tap.

It is claimed that the new tap shears the metal instead of tearing it, making possible accurate work on a production basis, and requiring only about half the time to drive it that the ordinary tap does.

New Crandall Dock for Baltimore

The Globe Shipbuilding & Dry Dock Company, Fairfield, Baltimore, Md., are to have at their new repair plant a 9,000-ton floating dock of the latest design. This dock is of the longitudinally-trussed sectional type designed and developed by The Crandall Engineering Company, Dry Dock Engineers, Boston, Mass. It measures 440 feet over the keel blocks, and 83 feet between the wing walls. The pumping is accomplished by 24 electrically-operated centrifugal pumps, the control of which is so centralized with indicators that the dockmaster may readily govern the pumping in all the compartments of the dock.

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SUN Marine Oils

SUN OILS

Viking Marine Engine Oil for Thrust Bearing and Reciprocating Engine Lubrication.

Viking Engine Oil is a newly developed marine oil. It conforms in efficiency with the accepted high standards which for years have been maintained in Sun XX Marine Oil.

A special refining process enables it to form a perfect and lasting emulsion with either salt or fresh water. Viking Oil is neutral in reaction and contains no fatty acids, thus eliminating the corrosion of metal parts produced by the high acid content of the majority of marine engine oils. It will not deteriorate and become rancid with age, and is unaffected at low temperatures.

Sun Turbine Oil for Marine Turbine Lubrication.

Sun Turbine Oil is a high grade oil which possesses low internal frictional values and separates readily from water. It maintains its viscocity under high temperatures, insuring efficient lubrication under all conditions.

Monitor Cylinder Oil.

Monitor Cylinder Oil has high flash, high fire and high viscocity—necessary characteristics of the correct oil for marine cylinder lubrication. It contains no animal fats.

The engineers of Sun Company are always available for consultation regarding the most efficient type of oil to meet any condition.

SUN COMPANY

Producer, Refiner and Distributor of Petroleum Products
PHILADELPHIA

Refineries: Marcus Hook, Pa.; Toledo, Ohio; Yale, Okla.

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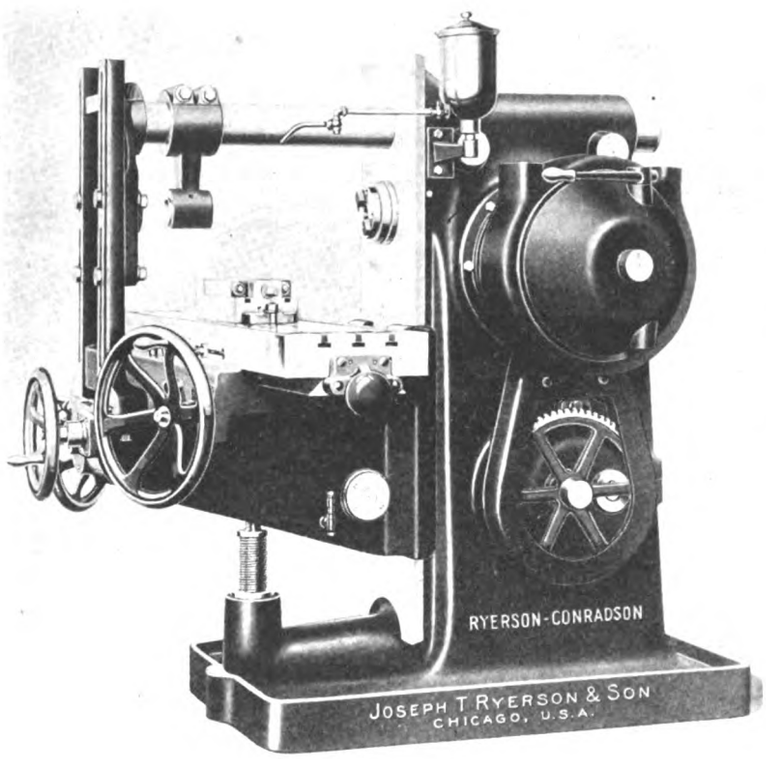
High Power Milling Machines

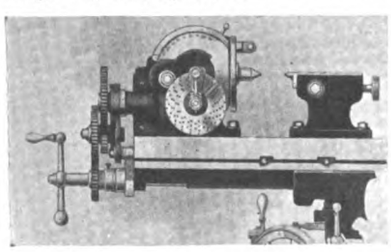
The first machine to be produced by the Ryerson-Conradson Company, the output of which is controlled by Joseph T. Ryerson & Son, Chicago, Ill., is the No. 3 Ryerson-Conradson High Power Milling Machine.

It is claimed that the new machine has highly increased power, rigidity and convenience of operation, and is adapted to light and heavy manufacturing and jobbing work.



Ryerson High Power Milling Machine, No. 3

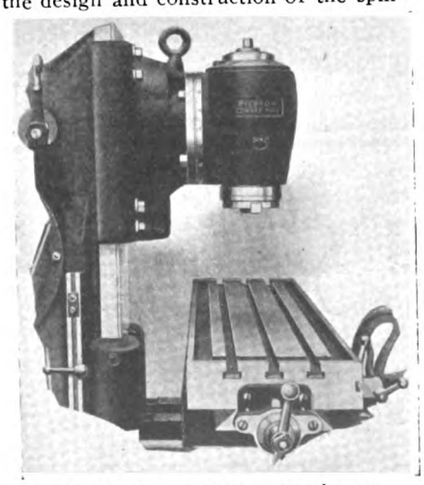
One feature of the design lies in the application of the helical drive, which tends to longer life and steadier operation of the milling cutter. The speed range required by the commercial milling machine has been maintained in the new design. The column is a rigid casting, ribbed internally, and cast integral with the base. A deep flange is turned around the base to stiffen it and to act as an oil retainer. The face of the column is extended above the overarm, which affords a firm support for special fixtures.



Universal Dividing Head

The knee is massive and deep, absorbing the vibration when heavy cuts are taken. The bearing surface between the knee and the column is greatly increased by extending the back of the knee up to a point nearly level with the top of the table.

To avoid all binding action when raising or lowering the table, an elevating screw is located at the center of gravity and is made telescopic. Both the table and saddle have large bearing surfaces. Special consideration has been given to the design and construction of the spindle, spindle drive, feed drive, safety devices and feed screw adjustment.



Semi-Universal Milling Attachment

The No. 3 Milling Machines are driven at a constant speed of 600 revolutions per minute, and require from 5 to 7½ horsepower. The gears run immersed in oil and are completely enclosed, so that they are dust-proof and practically noiseless. As the driving pulley is also enclosed, the machine conforms to all safety requirements of the Workmen's Compensation Laws.

Thrust is taken up by S. K. F. bronze bushed ball bearings, while the change gears are cut from solid chrome nickel steel, and are heat treated.

The Universal Dividing Head has been designed to meet the requirements of the modern shop practice. It is especially rigid and provided with an extra large worm wheel meshing with a worm journaled in large bearings. Regular equipment consists of three index plates that divide all numbers to 50 and many beyond; wrenches, bolts, driving dog and index table giving all divisions up to 360.

A Vertical Milling Attachment of the semi-universal type has been designed to fit the milling machine, and is made in three sizes—light, medium and heavy pattern. The base is clamped to the column dovetail, no dependence being placed on the overarm. The heavy pattern type has the same diameter spindle and the same size bronze bearings as the main spindle. The taper hole face plate and driving keys are also the same, permitting as heavy a cut to be taken as on the horizontal spindle. The drive is effected by an aluminum bronze gear bolted to the face plate of the main spindle and driven by the cross key. In return, it engages a steel gear on a horizontal shaft, driving a vertical spindle through a set of bevel gears. This allows the spindle to be set at any angle parallel to the face of the column.

Page Steel and Wire Acquired by American Chain

The American Chain Company, Inc., of Bridgeport, Conn., has purchased the control of the Page Steel and Wire Company, with mills at Monessen, Pa., and Adrian, Michigan. It is the intention of the American Chain Company to continue the business of the Page Steel and Wire Company as heretofore, taking only its surplus product. The Page Company's plants consist of open hearth furnaces, rolling mills, wire mills, as well as fence factories.

The new officers elected under the reorganization of the company are: Walter B. Lashar, president; William T. Morris, vice-president; Wilmot F. Wheeler, treasurer; John E. Carr, assistant treasurer and William M. Wheeler, secretary. E. C. Sattley, general manager of the Page Company, will continue in that capacity, with offices in Pittsburgh, Pa. The American Chain Company has its general sales offices in the Grand Central Terminal Building, New York City, and district sales offices in Chicago, Boston, Philadelphia, San Francisco, Portland and Pittsburgh.

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New Jersey Zinc

The world's standard for Zinc products

METALLIC ZINC

Boiler Plates: We furnish Boiler Plates of desired dimensions, and of the proper quality to serve best their purpose.

Slabs: Our "*Horse Head*" Slab Zinc (Spelter) is famous for its uniformly high quality, averaging more than 99.94 per cent. pure zinc. It makes the best babbitt metal for sea-going vessels.

ZINC DUST

Our "Sterling" quality is of unusual fineness, giving Marine Paint that imperviousness so necessary for "the maximum of protection," and has a metallic content of more than 95 per cent., which renders it particularly suitable for use in anti-corrosive paints for steel ships' bottoms.

We shall be pleased to send our Marine Paint formulae upon request.

ZINC OXIDE

Makers of paints applied to the interiors and exteriors of vessels find our Zinc Oxides most invaluable for providing in such paint the ability to withstand the rigor of salt water.

We produce both French Process and American Process grades.

Send for our Paint Specifications.

We manufacture a high quality of Rolled Zinc in sizes suitable for Hull Plates.

THE NEW JERSEY ZINC COMPANY, *160 Front Street*, New York

ESTABLISHED 1848

CHICAGO: Mineral Point Zinc Company, 1111 Marquette Building

PITTSBURGH: The New Jersey Zinc Co. (of Pa.), 1439 Oliver Building

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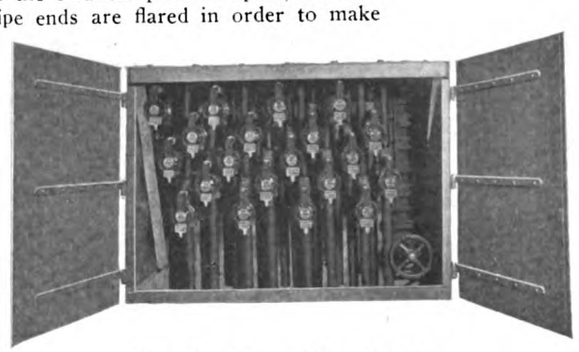
Detecting and Extinguishing Marine Fires

The fire menace from spontaneous combustion is very great in the inaccessible nooks and corners of storage spaces in the average ship. Detection of incipient fires is almost impossible because of this, and even when discovered it is difficult to get at a fire to extinguish it.

The Rich System for detecting and extinguishing marine fires operates on a combination of the two functions necessary to prevent conflagrations on ships at sea. In other words, it is designed to detect a fire by drawing samples of air to a central point in the wheelhouse from every danger spot in the ship, and to extinguish such a fire by drenching it with live steam.

When operating in its detecting capacity, should the air drawn to the cabinet contain the slightest trace of smoke, it may be detected, both visibly and by the sense of smell, by the officer in charge.

In detail, the Rich System comprises a system of single pipe lines radiating from a central point in the wheelhouse to every hold and cargo compartment in the ship. The pipes, which terminate in a detecting cabinet, are banked together in the smallest possible space, and the pipe ends are flared in order to make



Steam-Regulating Valve Cabinet

the sight of smoke more evident. The cabinet also contains a duplicate set of motor-driven exhausters which operate alternately while the system is working. By extinguishing the air from the cabinet, air samples are constantly brought to the cabinet from every closed space in the ship. Should the smallest fire start in any one of the holds, smoke appears at the mouth of the pipe connected to the hold in question.

When operating as an extinguisher, the pipes used for detecting the fire are also utilized for carrying the steam to put it out. A cabinet in the engine room or on deck, through which all pipes pass before going to the wheelhouse, contains the valves which control the admission of steam to the holds. When in operation, these valves cut off the pipe lines to the detecting cabinet, and, at the same time, admit high pressure steam to the pipes leading to the compartment on fire. Valves are, of course, numbered to correspond with each hold.

The original system is many years old, and has, in fact, been used for some time on the *Leviathan, Imperator, Mauretania, Aquitania,* and in ships of the Barber and Cunard lines.

The Rich System has recently been developed and perfected by Walter Kidde & Co., Inc., engineers and constructors, New York City. In its improved form, it is being installed in a number of new and reconditioned ships both by Government and private owners in this country, including the New York Shipbuilding Corporation, Camden, N. J.; the Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pa., and the Newport News Shipbuilding and Dry Dock Company, Newport News, Va.

Detecting Cabinet

Special Library Census

At a time when the Government is counting up its inhabitants, the Special Libraries Association is enumerating the special library collections of the country, because there does not exist at present an adequate directory of special libraries. In the spirit of co-operation, and in order to enlist the special information sources of the country, the Special Libraries Association—the national body of special librarians—submits the following questions and respectfully asks you to answer them. When compiled, the directory will not be used as a mailing list for advertisers, but merely for the purpose stated, to have in a central place a record of the special information sources of the country.

If your library comes within the above qualifications, the S. L. A. will appreciate the following information from you: (1) Name of institution or company. (2) Name by which library is known. (3) Name of librarian or custodian. (4) Can it be classified as any of the following: financial; business; legal; engineering or technical; institutional; municipal; reference; agricultural? (5) If not, how can it be classified? (6) Does it serve a special clientele? (7) Would your librarian be wiling to assist other special libraries to a reasonable extent?

The above data should be sent to William F. Jacob, Chairman Library Census Committee, care General Electric Company, Schenectady, N. Y., who will be glad to answer any questions relating thereto.

More Zinc Used in Government Paints

Standard paint specifications, under which the Government is recommended hereafter to purchase paints for use of the Army, Navy and other departments, have been determined upon by the Inter Departmental Committee for the Standardization of Paint Specifications.

Two features are significant: First, the importance of zinc oxide in increasing proportions is recognized by paint technologists on the committee; second, the latitude afforded by the specifications permits a large field of paint manufacturers to compete for Government business. The pigment proportions of the specifications follow:

	Minimum Percentage	Maximum Percentage
Zinc oxide	30	55
Lead (total, including either one or mixture of carbonate and sulphate)	45	70
Inerts and colors	0	15

The purpose of these specifications to provide for the purchase of prepared paints generally advisable in any section of the country, without requiring paint manufacturers to make up special batches. It is believed these specifications will include the formulæ of the majority of high grade paints on the market.

Of particular interest to paint manufacturers and users is the high proportion of zinc oxide introduced into the Government formula. This is regarded as one of the most sweeping official acknowledgments of this pigment's utility in paint yet recorded. Less than ten years ago, except in the Navy and the lighthouse service, no zinc oxide was included in paints used by the Government. It now composes 60 percent of the pigment of battleship gray paint that covers battleships and other U. S. Naval craft. The Capitol dome is covered with paint containing zinc, so that rust may be deterred; army cantonments are clothed with zinc paint, both inside and out, and during the war zinc paint aided in camouflaging the big field guns in France, as well as transports and battleships.

Recognition of zinc's efficiency has been a factor in the greatly increased popularity of ready-mixed paints. The durability of such paints makes their use economical, and they possess other advantageous qualities that commend them to users.

National Marine Week stands for American Independence on the Sea.

Where Do You Stand?

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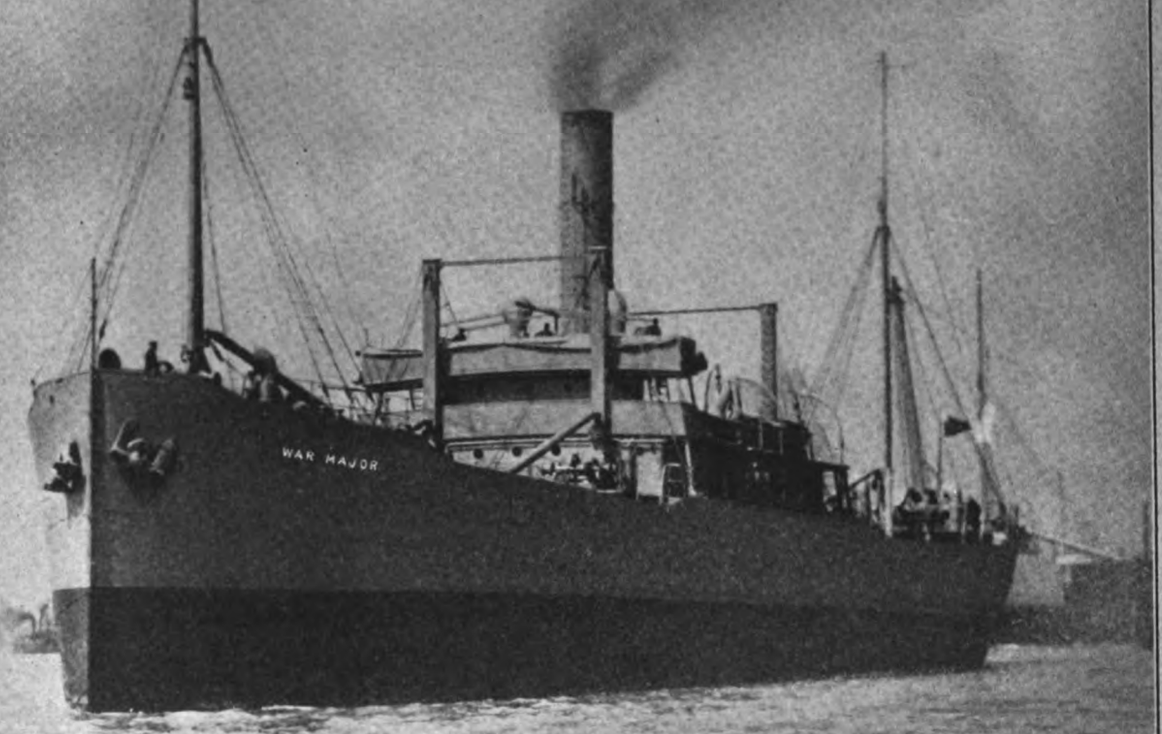
AMERICAN SHIP BUILDING CO.,

CLEVELAND, OHIO



SHIP BUILDERS ENGINEERS

DRY DOCKING REPAIRS

SHIPS BUILT TO THE HIGHEST CLASS OF BRITISH LLOYDS AND THE AMERICAN BUREAU OF SHIPPING FOR DEEP SEA SERVICE . . . . . .

—PLANTS AT—

CLEVELAND, OHIO DETROIT, MICH. BUFFALO, N. Y. WYANDOTTE, MICH.
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SUPERIOR, WIS. CHICAGO, ILL.

COMBINED CAPACITY OVER 500,000 D. W. TONS YEARLY

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MAKING SEA TRAVEL SAFE

Steward Equipment to Be Shown at Marine Exposition

With the introduction of water-tight compartments in ships some years ago, it was thought that sea travel had been made absolutely safe, and the auxiliary life-saving equipment, lifeboats and the means of launching them quickly and safely, was neglected. And then—the Titanic struck an iceberg and foundered. Even her meagre and wholly insufficient lifeboats could not be launched in time, and a thousand persons perished. Immediately, most countries put into effect laws to compel ships to carry sufficient lifeboats, but a quick and safe method of launching them could not be legislated into being. Inventors began to work on the problem, and recently the submarine peril added further stimulus to their efforts.

Of special interest, then, as showing the progress which has been made, is the announcement received from the Steward Davit & Equipment Corporation, that they will exhibit their life-saving equipment at the coming National Marine Exposition, at the Grand Central Palace, New York City, April 12-17. This company has produced many noteworthy devices for reducing the risk in launching life-boats at sea, some of which are:

The Steward Mechanical Davit, for moving the lifeboat out-board, with the greatest possible speed, and with minimum confusion and expenditure of effort.

The Steward Lifeboat Falls Controller, a device recently introduced, which has as its object elimination of confusion and risk incidental to lowering away. With it, the lowering is controlled by one man, and lowering on other than an even keel is rendered impossible. It also permits of using a simple falls which cannot become tangled. This is a much needed device, as in lowering away many accidents have occurred.

The Steward Lifeboat Releasing Device, by which one man in the stern of the lifeboat is able to release both falls simultaneously, and at the most favorable moment. The action is positive under all possible conditions.

The Steward Lifeboat Roller Carriage, for aiding the lifeboat to run smoothly down the side of a listed ship. This carriage is also provided with powerful springs to distribute shock when the lifeboat is swung against a rolling ship, and prevent its being smashed. As an addition to safer lifeboat launching equipment, this is of great importance.

The lifeboat itself has not been neglected, and the Steward "Deadrise" type has many features to recommend it. It is nearly rectangular in section, and built with fewer plates than the old type. Its makers claim for it lower center of gravity and greater stability, less chance of leakage and greater capacity. It is being widely adopted. Even that standard piece of equipment, the line throwing gun, has had its share of attention; the Steward gun is so designed that the center of recoil comes well within the base, and the gun will not throw itself backward when fired.

Taken all together, the Steward equipment seems to be admirably designed for its worthy purpose—the saving of lives at sea, by substituting for the uncertain human factor, wherever possible, an unfailing mechanical device.

The Steward Davit & Equipment Corporation, 17 Battery Place, has asked us to extend through our columns a cordial invitation to all of our readers to visit them at the exposition.

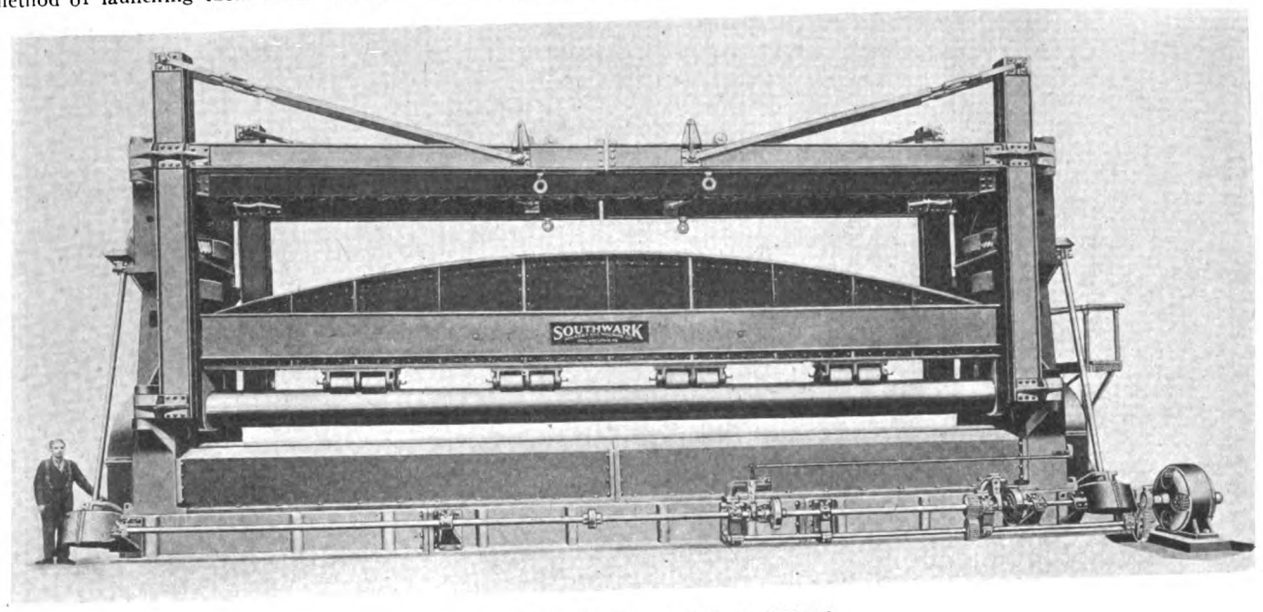
National Marine Week stands for American Independence on the Sea.

Where Do You Stand?

World's Largest Plate Bending Roll

What is believed to be the largest plate bending roll in the world is now being installed by the United States Government at Mare Island Navy Yard, California. The machine was designed and built by the Southwark Foundry & Machine Company, Philadelphia, Pa.

The machine is of strong back construction of heavy proportions. The forged steel rolls are mounted in cast steel housings of box type construction. The roll housings are mounted on a heavy cast iron sub-base, while the top roll is supported at four points between the bearings by steady bearing rollers. These rollers are carried by a heavy arch beam, constructed of rolled steel sections. The strong back girder is fitted into the crosshead, both crossheads being hung on a swivel, so that the top roll may be thrown out of parallel. Steel gears with cut teeth are fitted throughout, and all bearings are bronze bushed.



Largest Plate Bending Roll in the World

Four jib cranes, two at each side, with trolleys and eyes ready for attaching hoists, are provided for handling the work. The screw-down is operated by a separate motor of 50-horsepower, assuring accuracy and simplicity of mechanism. The rolls are driven by a 150-horsepower motor operating at a speed of 575 revolutions per minute.

The machine was designed to handle what are undoubtedly the largest plates ever rolled. It has a capacity for bending 37 feet of 1¼-inch plate. The machine measures 37 feet between housings. The top roll is 20 inches in diameter, and the lower rolls are 18 inches in diameter. The total weight of the machine with motors is 495,000 pounds. Nine cars were required to convey the knocked down machine from Philadelphia to Mare Island.

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at the

MARINE EXPOSITION

GRAND CENTRAL PALACE

NEW YORK CITY

APRIL 12th to 17th, 1920

AMERICAN MANGANESE BRONZE COMPANY

HOLMESBURG, PHILA., PA.

specialists in

LARGE PROPELLER WHEELS

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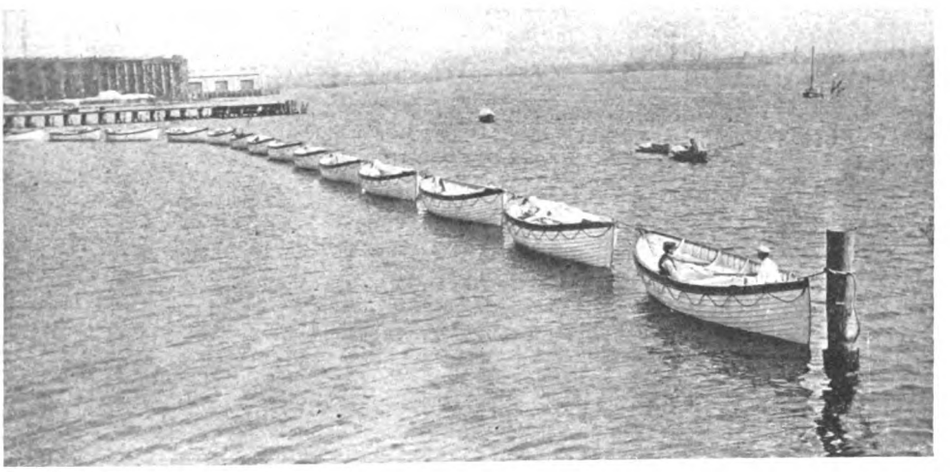
HIGH GRADE BRONZES FOR ALL ENGINEERING PURPOSES

WOODEN LIFE BOATS



WE BUILD THEM Complying strictly to the Board of Trade. This cut shows few of an order for South America.

We make a specialty of Yachts and Commercial Vessels. If interested write us and get our proposition.

Honest Boats Honestly Built.

THE NILSON YACHT BUILDING CO., INC., BALTIMORE, MD.

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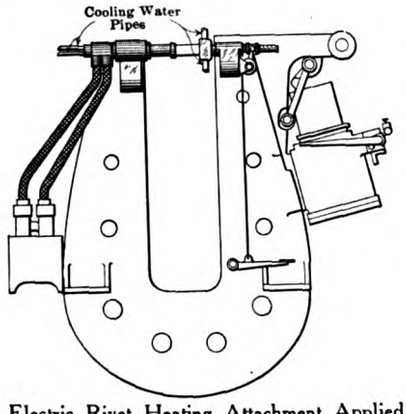
Electric Rivet-Heating Attachment for Bull-Riveting Machine

An electrical rivet-heating device, intended for use on gap, bull and hydraulic riveting machines, has recently been placed on the market by the United States Electric Company, New London, Conn. The attachment is arranged so that a hot rivet is left in front of the plunger at all times during the riveting operation.

Rivets are placed in their holes cold and the work to be riveted is moved so



Electric Rivet Heating Attachment Applied to "Hanna" Riveter

that it comes in contact with the electrodes automatically or by the motion of the plunger operated by a hand lever. The electrodes are so constructed that the rivets may be heated at once by bringing one rivet to the proper heat while the others are being pre-heated.

Ordinary equipments are built to heat rivets of ½ inch to 1¼ inches diameter, but special machines may be built for larger diameters.

All sizes are available for use with alternating currents of 110 or 220 volts.

Mono Corporation Formed

The Mono Corporation of America, 48 Coal and Iron Exchange, Buffalo, N. Y., announces that it has purchased the entire stock of the Mono apparatus and accessories from the F. D. Hager Company, Buffalo, N. Y. This includes all rights for the manufacture and sale of the various types of Mono apparatus for the automatic analysis of CO_2, CO, O_2, H_2, SO_2, CI, etc.

It is to be noted that Mr. F. D. Hager, M. E., has not severed his connection, but will serve as general manager of the new corporation. Under his management all users of gas who have need of analysis and recording apparatus can depend upon prompt and careful attention to orders and inquiries.

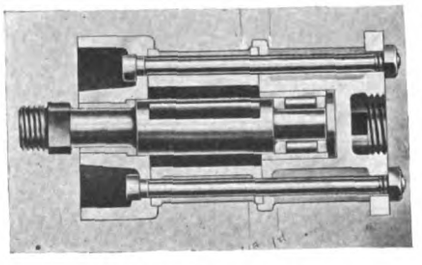
A service and inspection department, connected with the laboratory, is now in operation, and a competent chemical engineer in charge. Careful erectors will be placed at the disposal of customers in connection with the erection of new work, and regular inspection trips will be arranged to visit existing installations with a view to bringing about closer co-operation between the customer and the corporation. Mr. Hager, through the newly organized corporation, assures all of his friends and users of Mono apparatus generally that they can safely put their problems up to the corporation and consult them on such matters as chemical combustion of fuels and process work.

Efficiency in Boiler Tube Cleaning

Too much importance cannot be given the matter of tube cleaning in obtaining a high efficiency of boiler operation. There are various ways of cleaning tubes, but mechanical cleaners have been particularly useful in accomplishing satisfactory results.

Various cleaners produced by the Roto Company of Hartford, Conn., include air, steam and water-drive types. It is claimed that with the type A.D., having a positive balanced motor which replaces the usual water turbine drive, a set of tubes may be cleaned in a much shorter time than formerly required, at the same time eliminating any chance of injury to the tubes. Where an air compressor is available to supply the driving force, operating costs may be cut considerably. When steam is used, little inconvenience is experienced except in confined spaces.

The cleaners are equipped with positive-acting rotary engines. The cylin-



Sectional View of Motor

der bore of the engine, across which a single balanced blade fits in all positions, is not of the circular form ordinarily used in rotary engines. A single blade is used instead of the double or split type blade to reduce wear and friction, as well as to obtain a better balance. The driving force of the motor is similar to that of a piston engine, but turns it over at nearly the speed of a turbine. In the case of the Roto cleaners, the motors are balanced, double-acting and self-starting.

Hardened steel rings keep the casing straight, up to size and a correct fit for the boiler tubes after long service. These protecting rings prevent the cutters from wedging or sticking in the tubes and the consequent wearing to a taper form or becoming undersized, and so failing to function properly.

BUSINESS AND PERSONAL NOTES

The Consolidated Utilities Corporation, 730 South Michigan avenue, Chicago, has taken over the distribution of the Matthews full automatic electric light and power plants for country homes, which are manufactured at Sandusky, Ohio. Three models are made in marine styles, with rubber jar batteries, suitable for launches, cruisers, houseboats and barges. No water tank is furnished with these, but a suitable pump is supplied for circulating cooling water from outside the hull of the boat.

The Vulcan Iron Works, Inc., Jersey City, N. J., announces that Mr. George M. Ogle, formerly chief electrical engineer of the United States Shipping Board Emergency Fleet Corporation, is now a member of their engineering organization, in charge of the electrical contracting and consulting engineering department.

The Plant Engineering and Equipment Company, Inc., of New York City, manufacturers of the well-known Corliss Valve Steam Traps, Mason Condensation Meters and other power and heating specialties, announces the opening of its twenty-sixth office to care for the increasing demands for its products. Mr. M. William Ehrlich, experienced in consulting and contracting engineering, will be the New Jersey manager in charge, with headquarters at Newark, N. J., and a sub-office at Lyndhurst, N. J.

The Penn Seaboard Steel Corporation and the Admiral Anchor Company have removed their New York offices from 111 Broadway to 2 Rector street.

The Marine Corporation, Alaska Building, Seattle, Wash., announces that it is prepared to negotiate the purchase and sale of marine securities, making a special feature of certificates of ownership in merchant ships in commission. Correspondence on all matters relating to marine investments is invited.

In answer to an inquiry, the International General Electric Company, Schenectady, N. Y., announces that it has not taken over any American interests in the Franco Tosi Company, of Milan, Italy. The company, however, has contractual relations with Franco Tosi, S. A., whereby the latter acts as the representative of the former in Italy.

The Lidgerwood Manufacturing Company will have an interesting exhibit at the National Marine Exposition to be held in the Grand Central Palace, New York, April 12-17. They will exhibit two types of their standard reverse valve cargo winches. They have installed a compressed air outfit, to make an actual demonstration both of the hoisting ability of these winches and the extreme simplicity of control. The exhibit is at Booth No. 43, and is

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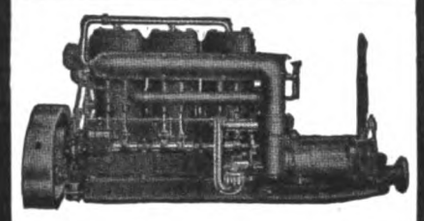
POWER



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PLUS FUEL COST REDUCED

From 70 to 80 per cent without sacrificing reliability, flexibility or control. Perfect combustion on kerosene or lowest grade of Coast Distillate.

5 to 200 H. P. — 1 to 6 Cylinders

Ask for Catalog 73.

WOLVERINE MOTOR WORKS, Bridgeport, Conn.

STRATFORD SPECIAL NO. 1 MARINE OAKUM

receives the highest classification of the American Bureau of Shipping and Lloyd's Register of Shipping. It meets the requirements of all of the United States Government specifications. For years we have guaranteed the quality of each bale to be standard of excellence and returnable at our expense if otherwise. More of this grade Oakum has been used by the United States Government and its contractors than all other makes combined, yet, not a single bale has been condemned or rejected, whereas it has replaced the condemned Oakum of almost every other make. Our experience, quality and service are worth more to you than we ask.

GEORGE STRATFORD OAKUM COMPANY **Jersey City, N. J.**

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INTERNATIONAL

COMPOSITIONS FOR IRON AND STEEL VESSELS' BOTTOMS

In use and in stock at all ports of the world. **Over 18,000,000 gross tons of shipping coated annually**

Proprietors of INTERNATIONAL COMPOSITION, ANTICORROSIVE, and ANTIFOULING

INTERNATIONAL COMPOSITIONS CO. **Offices, Welles Bldg., 18 Broadway, N. Y.**

FOR SALE

Triple Expansion Marine Engine 18" x 32" x 54"—42" stroke. Has been in service fifteen lake seasons in a wooden steamer of 3000 tons capacity. Has been thoroughly overhauled and is in A-1 condition. Shipping weight approximately 70 tons.

Windlass, 8 x 10 of Providence manufacture, suitable for 1¾" stud link chain. Arranged for capstan drive. In first class condition.

Both subject to inspection. Immediate delivery.

McDougall-Duluth Company
Duluth, Minn.

MARINE ENGINES

We want a live concern of good financial standing, capable of organizing sales for the United States of high-grade four-cycle Swedish Marine motors of first class construction, using both gasolene and kerosene, and solicit inquiries.

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in charge of Mr. Ed. J. Boynton, who has had sea experience, was employed in the Lidgerwood works supervising the construction of their winches, and is now a member of their selling and engineering force.

The death, on January 27, of Mr. Pierregrant Bigelow, treasurer of the Bigelow Company, 149 Broadway, is announced by the company.

At a recent meeting of the stockholders of the Buffalo Forge Company, Buffalo, N. Y., new officers were appointed as follows: Henry W. Wendt, president; Edgar F. Wendt, vice-president and treasurer; C. A. Booth, vice-president and sales manager. The new directors include the above named officers and Mr. H. S. Whiting.

The Wheeler Condenser & Engineering Company, Carteret, N. J., announce the publication of the 1920 edition of their "Steam Tables for Condenser Work." This is the fifth edition of these tables. The pressures below atmospheric have been especially calculated for this book by Professor Marks. The book gives the properties of saturated steam from 29.8-inch vacuum to atmospheric pressure in increments of tenths of an inch. The vacuum in inches of mercury is referred to a 30-inch barometer. This method is of course superior to the old method of giving absolute pressures in pounds per square inch, since it is customary to read vacuum in inches of mercury. A complete table of the properties of saturated steam above atmospheric pressure is also included. The book indicates how to make measurements by means of the mercury column and barometer. It gives the contents and tables for making corrections, including those for the relative expansion of the mercury and the brass scale. It is a very handy book, and of a size that can be carried around in the vest pocket.

The Admiral Anchor Company, Penn Seaboard Steel Corporation, and Tacony Steel Company will have Booth No. 30 at the National Marine Exposition, Grand Central Palace, New York, April 12-17. A feature of their exhibit will be an Admiral Anchor.

Mr. Percifor Frazer announces his connection with the Merchant Shipbuilding Corporation, 1202 Finance Building, Philadelphia, Pa., where he is prepared to meet inquiries for vessels of any description and tonnage.

D. J. Flynn, open hearth superintendent of the Tacony Steel Company, has been transferred to the New Castle plant of the Penn Seaboard Steel Corporation, with which the Tacony Steel Compan recently merged. Mr. Flynn has had wide experience in the melting of the highest grade of alloy steels.

Mr. Morris Legori, for the last two years manager in Argentina for Vielé, Blackwell & Buck of New York, as manager of the firm's newly created foreign department, has joined Ray D. Lillibridge, Inc., 111 Broadway, New York, export advertising counsellors.

TRADE PUBLICATIONS

Chains—The Columbus & McKinnon Chain Company, Columbus, Ohio. 20 pages, illustrated. 5 by 8.

Marine Equipment, Catalogue 19. Stevens-Alysworth Company, Inc., 253 Broadway, New York. 24 pages, illustrated. 6 by 9.

The Answer to the Question of Labor and Production. duPont Chemical Company, Wilmington, Del. 28 pages. 8½ by 4.

Stratton, Jr., Oil Separator—Bulletin 1120. The Griscom-Russell Company, 2124 West Street Building, New York. 12 pages, illustrated. 6 by 9.

Hauck Burners for Foundries, Boiler, Machine and Repair Shops. Bulletin 112. Hauck Manufacturing Company, 111 11th Street, Brooklyn, N. Y. 16 pages, illustrated. 6 by 9.

Grinnell Company Bulletin—General Fire Extinguisher Company, 277 West Exchange Street, Providence, R. I. 16 pages, illustrated. 8 by 10½.

Brown Pyrometers—Catalogue No. 12, published by the Brown Instrument Company, Philadelphia, Pa. 88 pages illustrated. 8 by 10.

Durable Wire Rope—Issued by the Durable Wire Rope Company, 93 Pearl Street, Boston, Mass. 38 pages, illustrated. 3½ by 6¼.

Condensing Apparatus—Published by the Worthington Pump & Machinery Corporation, 115 Broadway, New York. 116 pages, illustrated. 6 by 9.

Catalogue of Valves, Hydrants, Steam Traps, Asbestos-Packed Cocks. The Pratt & Cady Company, Hartford, Conn. 192 pages, illustrated. 4¼ by 7.

Grinder Book No. 26—Columbia Manufacturing Company, Belleville, Ill. Covers grinders and buffers, grinding shafts and pressors for the heavy mill supply and automobile trade.

Ashton Pop Safety and Relief Valves, Pressure and Vacuum Gages, Locomotive and Power Plant Specialties. The Ashton Valve Company, Boston, Mass. Cloth bound. 176 pages, illustrated. 6¼ by 9¼.

1920 Wall Map Calendar—The Metal & Thermit Corporation, 120 Broadway, New York. Shows railroad time zones in the United States and Canada; also shows illustrations of Thermit welding jobs as applied to stern frames, rail, special welding and locomotive frame repairs.

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Marine Draftsman—Large shipyard in vicinity of New York has openings for the following men: Turbine Designer, preferably man with experience in designing Parsons turbines; Marine Steam Engine Designer; Engine, Pipe and Electrical Draftsman; technical graduates preferred. Positions permanent, with excellent opportunities for advancement. Address *Box 798*, care of MARINE ENGINEERING.

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Position Wanted as Steam Specialty Man or Pipe Foreman; 42 years of age; 12 years' experience as general foreman pipe department marine shop on repair and new work. Has served in a position as engineer. Best references. Address *Box 11*, care of MARINE ENGINEERING.

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Mechanical Engineer with college education having full charge of machinery in large shipyard on Atlantic Coast, desirous of making a change. Wants position with engineering or contracting company. Has the handling of men. Age 44 years. Salary $85 per week. Address *Box W-4*, care of MARINE ENGINEERING.

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Naval Lieutenant, with nine years' practical operating experience in engineering department of vessels with various types of installations, desires position as Chief Engineer of ocean steamer or yacht. Licensed as unlimited chief; 32 years of age; unmarried. Will consider $4,000 salary. Expect to be released June 1. Correspondence invited. Address *Chief Engineer*, care of MARINE ENGINEERING.

A Progressive and Practical Shipbuilder, 20 years' experience, superintendent of hull construction with a good organization of foremen and first-class hull mechanics; now employed in a large Emergency Fleet Corporation yard that will soon close, would like to locate with a permanent yard whose efficiency of production is below the best yards. Would consider any of the following positions: Works Manager, Assistant Works Manager, Superintendent or Assistant Superintendent of Hull Construction. Understands berthing system that has increased the efficiency of all hull crafts, riveting gangs now averaging above 60 rivets per hour. Understands structural steel shop methods. Address *Box 595*, care of MARINE ENGINEERING.

Government Sales

Sealed pids will be received until 11 o'clock A. M., April 7, 1920, by the United States Shipping Board Emergency Fleet Corporation, at the office of the Manager of the Supply and Sales Division, Sixth and B streets, S. W., Washington, D. C., for the sale of the said Corporation's Shipbuilding Plant at Wilmington, N. C., including the tools and equipment.

The property offered comprises about 42 acres used for shipyard purposes with 1,600 feet of waterfront, is located on the Cape Fear River, within the limits of the city of Wilmington, N. C., with spur to Atlantic Coast Line R. R. This yard has been one of the efficient shipyards in the South Atlantic District for the building of concrete ships of 3,500 D. W. T.

Detailed inventory, blueprints and photographs and other data of said shipyard have been filed in the office of the manager of the Supply and Sales Division, Sixth and B streets, S. W., Washington, D. C., and may be inspected by prospective bidders during business hours. Copies of a description of the yard, abstract of inventory and any further information, may be obtained on application.

Bids must be submitted in duplicate on standard proposal forms and enclosed in a sealed envelope marked "Proposal 3021.

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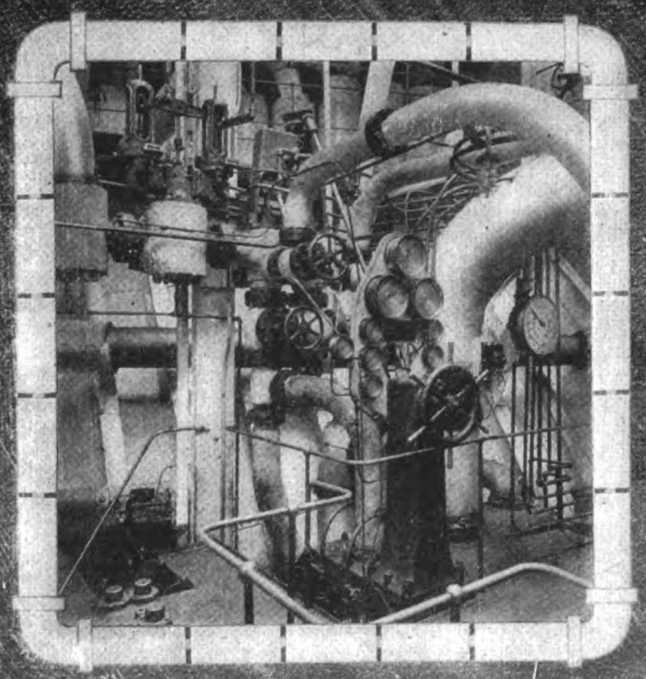

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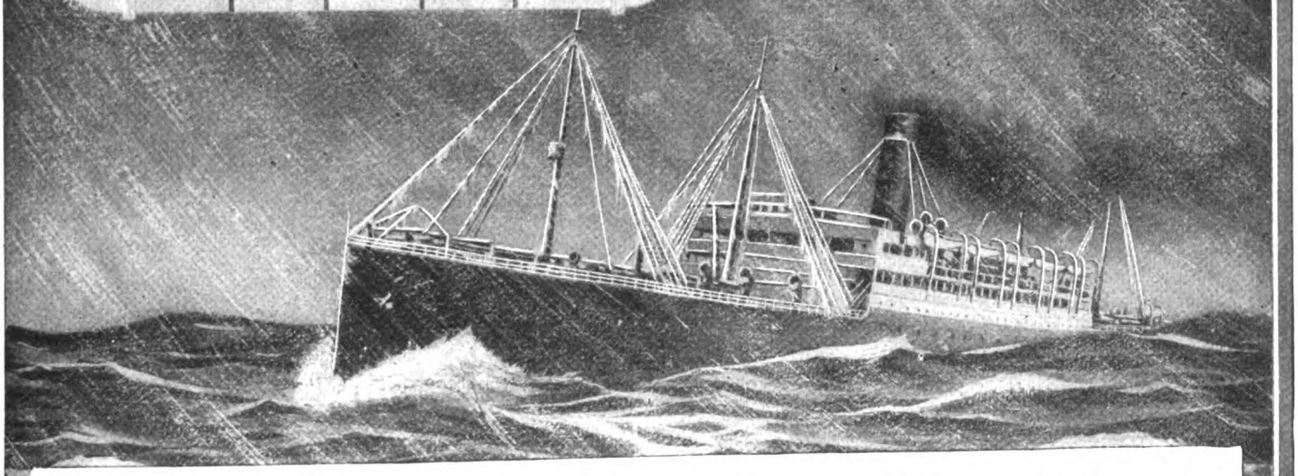

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General News and Technical Notes

TWENTY-ONE SHIPPING CONCERNS ORGANIZED IN MARCH

Capital of $61,850,000 Involved—Twelve Companies of $1,000,000 or more—Previous Records for March Broken

New enterprises in the shipping, shipbuilding and allied industries involved the organization during March of twenty-one companies, with an authorized capital of $50,000 or greater, the total indicated investment in these concerns appearing as $61,850,000. Both in point of the number of companies formed and of aggregate authorized capital the March record represents an improvement over the preceding month, when seventeen concerns were launched with an aggregate authorized capital of $33,380,000. The March figures compares with $9,276,000 in March, 1919, and is larger than for any month of last year. It is roughly $14,500,000 below the January total, however.

The indicated investment in new shipping enterprise during the first quarter of the current year, as shown by the compilation of *The Journal of Commerce*, is $171,535,000. This compared with $23,201,000 for January-March, 1919, the gain of approximately 641 percent reflecting the growth of interest in the American merchant marine. It should be noted in connection with this comparison, however, that the first quarter of 1919 was a period when the general reaction in virtually all lines of industry and enterprise was most severe following the armistice.

Twelve companies were organized in March, with an authorized capital of $1,000,000 or greater. These were the American Coastwise Steamship Company, $5,000,000; American Merchant Mariners, Inc., $5,000,000; Disappearing Propeller Boat Company, $1,200,000; European Navigation Company, $1,500,000; Farragut Steamship Corporation, $1,000,000; International Coal Transportation Corporation, $2,700,000; Lord Drydock Corporation, $20,000,000; Pequot Steamship Company, $1,500,000; Perhaspake Towing & Transportation Corporation, $2,000,000; Russian, Slavic & American Steamship Corporation, $3,500,000; Submarine Exploration & Recovery Company, $10,000,000, and the Seattle Shipbuilding & Dry Dock Corporation, $5,000,000. Only seven companies of such proportions were started in February, ten in January.

The following list comprises names, State of incorporation and authorized capital of new shipping companies organized in March, 1920:

American European Line, Inc., Del.	$100,000
Am. Coastwise Steamship Co., Del.	5,000,000
Am. Stand. Shipfittings Corp., Del.	800,000
Am. Merchant Mariners, Inc., Del.	5,000,000
Brown Navigation Co., The, Del..	150,000
Cananova Steamship Corp., Del....	525,000
Cayo Mambi Steamship Corp., Del.	525,000
Disappear'g Propeller Boat Co., Del.	1,200,000
European Navigation Co., Del....	1,500,000
Farragut Steamship Corp., Del....	1,000,000
Independ't St'mship Co., The, Del.	500,000
International Coal Transportation Corp., Del.	2,700,000
Lord Drydock Corp., Del.	20,000,000
New York & Baltimore Inland Transportation Co., Del.	300,000
Northsea Co., Ltd., Del.	350,000
Pequot Steamship Co., Del.	1,500,000
Perhaspake Towing & Transportation Corp., Del.	2,000,000
Russian, Slavic & American Steamship Corp., Del.	3,500,000
Submarine Exploration & Recovery Co., The, Me.	10,000,000
Seattle Shipbuilding & Dry Dock Corp, Del.	5,000,000
Swiftsure Oil Transport, Inc., N.Y.	200,000
Total	$61,850,000

TO CLASSIFY U. S. SHIPS

American Bureau Will Survey For Shipping Board

An arrangement has been made between the Shipping Board and the American Bureau of Shipping, 66 Beaver street, whereby all Shipping Board vessels, some 500 in number, now having Lloyds classification only, will be classified by the American bureau.

This matter was brought up while Judge Payne was chairman and he favored it, provided the American Bureau took over the classification without cost to the government. The American Bureau originally asked $150 a ship.

Commodore E. P. Bertholf and Captain C. A. McAllister, vice-presidents of the American Bureau, agreed to the proposal of Judge Payne, with the understanding that they will make all future surveys on the vessels taken over.

This means the formal recognition of the American Bureau of Shipping as the official classification service for American ships so far as the Shipping Board vessels are concerned.

International Trade Conference

The United States Chamber of Commerce has invited Great Britain, France, Italy and Belgium to a joint commercial mission, to be held at Atlantic City during the week of September 29.

The Herreshoff Manufacturing Company, Bristol, Conn., has received a contract from Carl E. Tucker, New York, to build an 80-foot waterline schooner yacht for the 1920 yachting season.

Instantaneous Water Heater

A new heater has been designed by the Griscom-Russell Company, New York City, to be used as a boiler feedwater heater, or wherever quantities of water are to be heated by live steam.

The system provides for the water to pass through tubes fastened in a shell, through which live or exhaust steam circulates. The water passing rapidly through either two, four, six or eight sections or tube bundles is rapidly raised to the desired temperature. It is claimed that the heater can be operated far in excess of its rated capacity with only a slight reduction in the final temperature of the water. The shell and head covers are of cast iron, while the tube plates are of rolled steel. The heating surface consists of ⅝-inch outside diameter seamless brass tubing. Tubes are expanded into the tube sheet; one tube plate is attached rigidly to the shell, while the other of the floating type permits the tubes to expand and contract without any strain on the joints.

Instantaneous Water Heater

The shell is designed for a steam working pressure of 50 pounds per square inch, and the tubes and water chambers for a pressure of 250 pounds per square inch. Saddles are supplied for supporting the heaters in horizontal or vertical positions as desired.

Cammell, Laird & Co., Ltd., Birkenhead, Eng., have booked an order for two geared turbine steamers for the Osaka Shosen Kaisha, of Nagasaki. The vessels are to displace 15,000 tons, and will have a sea speed of thirteen knots.

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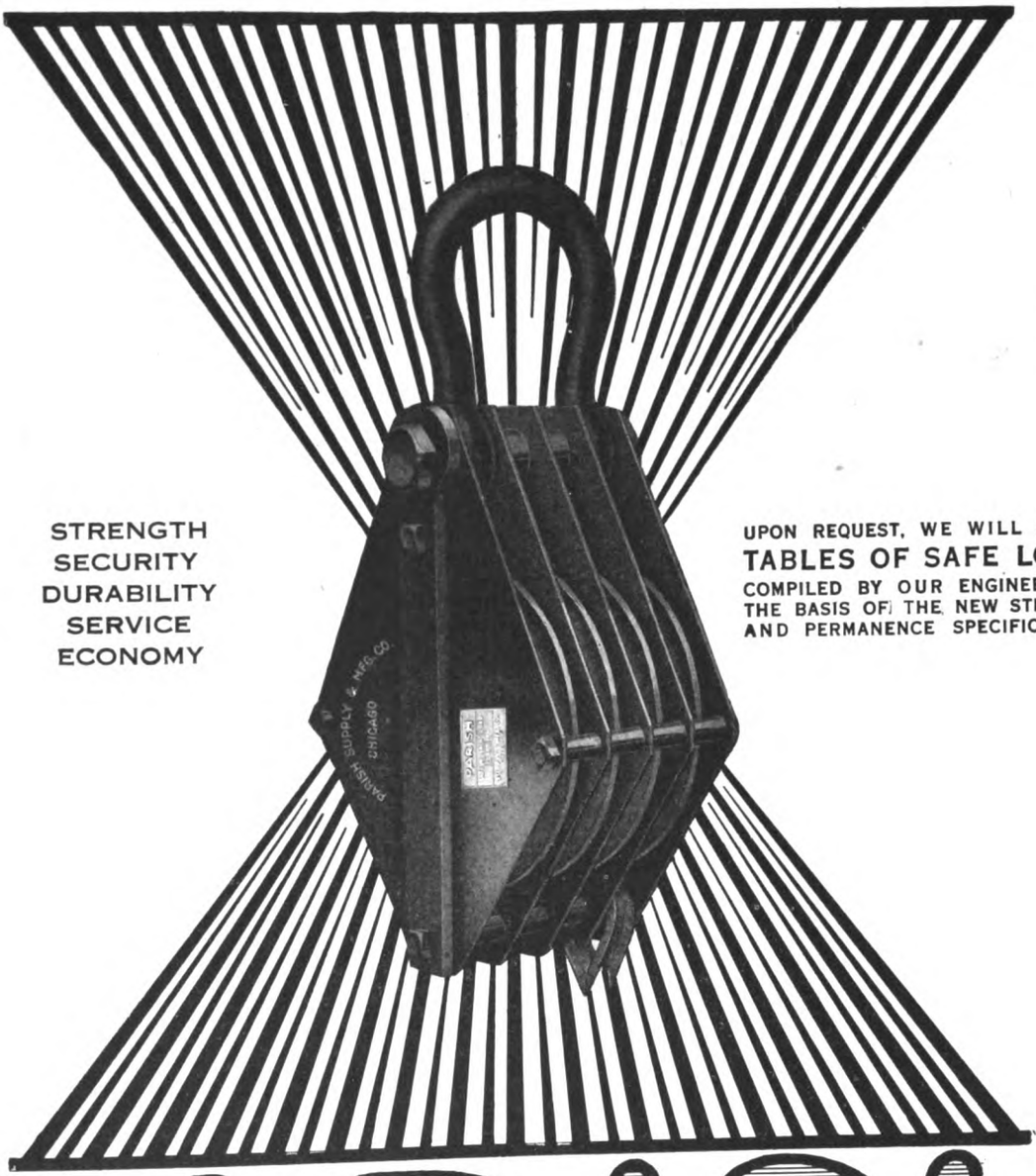

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Marine Electrical Fixtures

Several new devices for marine electrcial installations have been produced by the Seidler-Miner Company, Detroit, Mich. These include the Universal Conduit Box having a false bottom plate to which all wiring is fastened, and which provides a better means than fixed bosses for the holding-down screws of wiring devices. Because of the fact that this plate is supported at its outer edge by bosses having washer head screws, holes may be made in the plate for different spacings, and the projecting screw ends thus be allowed clearance in the intervening space. Because of this clearance, devices such as key sockets may be swung around to bring the key to any desired point, regardless of what angle the screw holes are placed in relation to the key.

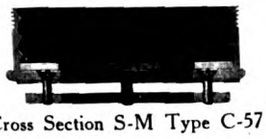
The S-M U-Box, as it is designated, is also provided with the usual bottom bosses and standard screw spacing for

Cross Section S-M U-Box

Bryant devices, hence may be used without the bottom plate if desired.

Another feature of the box is the threaded outlet which is ready for a pipe connection at all times by simply knocking out a plug. It may, therefore, be used either as an outlet box or as a fixture body.

Another of the devices, the S-M Type C-57 globe holder for 3½-inch diameter globes and 60 watt lamps, may be quickly



Cross Section S-M Type C-57

and solidly clamped to the S-M Universal Box. When larger lamps up to 150 watts are desired, the Type E Watertight Globe Fixture may be used. This is similar to Type C-57 and as such readily attachable to the Universal Con-

S-M Water Tight Switch

duit Box. It is made of brass and furnished with a 4¼ by 8-inch, Type E globe and a Type E guard. By the addition of this unit the S-M convertible devices may be used for from standard 60-watt equipment up to 150-watt.

The C-57, Type E, and other types of globe holders may be fitted with Bryant watertight receptacles for several uses in places exposed to the weather.

Another special device is the S-M watertight switch, which includes the Universal Box fitted with a cover having the Bryant watertight switch mechanism. The combination includes either a 5-ampere, single or double pole switch. The Universal Box may also be fitted with a Bryant watertight plug and plug receptacle in either the single or multiple box type. The multiple box Type DB-DC includes both the Bryant plug and Bryant switch as described above.

A complete catalogue of marine electrical fixtures will be supplied by the Seidler-Miner Company on request.

BUILDING ON OWN ACCOUNT

Coughlan Concern, Vancouver, B. C., First in Canadian Field

The steamship Braeholm, now completing at the shipyards of J. Coughlan & Sons, Ltd., Vancouver, B. C., is said to be the first ship laid down by a Canadian shipyard to its own order. The company started construction in December last, and shortly afterward sold the ship for approximately $1,500,000. She is 8,800 deadweight tons, fitted with triple-expansion engines, and built to attain a loaded speed of 11.5 knots.

The Coughlan company is starting construction of the graving dock on Burrard Inlet. It will be completed in about thirty months at a cost of approximately $3,000,000. It will be 750 feet long, 110 feet wide. Repair shops will be part of the equipment, and there will be an auxiliary marine railway, capable of handling vessels to 8,800 deadweight tons. This will be operating in eighteen months.

Shipping Board Changes

Col. E. H. Abadie has resigned, effective May 1, as general comptroller of the Shipping Board, and Alonzo Tweedale, treasurer of the Board, has been appointed to succeed him. Mr. Tweedale will continue as treasurer of the Board until a successor has been appointed.

E. E. Palen, director of the South Atlantic District at Norfolk, has resigned, and has been succeeded by Captain W. E. Griffith.

Commissioner Thomas A. Scott has brought his work at Washington to an end, and officially ended his connection with the Shipping Board on April 15. His duties have been distributed between Commissioners John A. Donald and Raymond B. Stevens.

K. E. Hurlburt, secretary to Commissioner Scott, also severed his connection with the board on April 15.

Martin J. Gillen, Republican, of Wisconsin, has been nominated by President Wilson to succeed to the vacancy as Shipping Board Commissioner left by Henry M. Robinson of California.

SAVING TIME AND MONEY

The Vortex Painter Claims to Have Solved the Problem

A few of the characteristic difficulties of paint spraying are loss of paint, scattering and wind splashing over surfaces not to be painted, uselessness in the open air, owing to the interference and pre-drying of the paint to a chalky consistency through evaporation of its volatile oils while in the air.

The problem, as seen by the laboratory of the Vortex Manufacturing Company, Cleveland, Ohio, was to confine the paint jet to a definite radius while in transit from the nozzle to the surface to be painted; to reduce splashing and prevent volatilization. The solution took the form of what might be termed a hollow, conical air jet within which the paint is liberated.

The nozzle of the Vortex Painter has two openings—a central opening for paint and an annular opening around the center from which the air is discharged as a veritable blast under a pressure approximating 60 pounds to the square inch. There are separate conduits for air and paint, terminating in a right angle on each side, which forms an axis for the nozzle and permits it to be operated at any desired angle. Among the claims for the Vortex painter are carrying a greater volume of paint per minute, due to the fact that it is applied in a relatively heavy liquid jet, better penetration of rough surfaces, an efficient brushing action by the air jet which makes it possible to cover completely and smoothly with a single coat, and dispensing with scaffolding very largely by use of a 12-foot arm, when desired.

The Vortex Painter has consistently maintained records of 2,000 square feet per hour or more on plain interior work, where conditions were wholly favorable and the operator experienced in his task. In a recent job at the East Fifty-fifth street (New York) gymnasium, figures of the time spent in previous hand painting made a good basis for comparison. Panels 104 square feet in size had been hand-painted by two men at an average of 35 minutes per panel for a single coat. The Vortex appliance handled by one man did a panel every 5 minutes, and the single application equaled two or perhaps three brush-applied coats in cover. Possibly a more striking demonstration was the painting of a huge storage tank on the roof of the new Overland building in Cleveland. This was given a single, but sufficient, protective coating of red in 3½ hours, covering 3,500 square feet of surface.

No ladders or scaffolding were required. To make the test more difficult, there was a high wind at the time. One painter, with the aid of a helper in handling and arranging the hose, did the whole job.

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BIG TANKER CONTRACT

Norway-Pacific Company To Build for Norwegian Concern

M. G. Thomle, president of the Norway-Pacific Shipbuilding Company, which has installed a large shipyard in Everett, Wash., has sent the following telegram from New York to Seattle shippers: "Have closed contract for our company with Norwegian Tankers Company, Ltd., of Christiania, for five 10,600-ton tank steamers, totaling $11,000,000. These tankers are the first unit on tanker contracts to be let here for use in transporting oil from Mexico to Europe and the Orient. Oil storage stations are to be installed in all principal ports. One hundred million dollars have been subscribed by English and Mexican oil interests for construction of tankers and storage stations throughout the world. Our new contract carries preference on this business up to our capacity."

Engineering Firms Merge

Of general interest is the combination recently announced of the organization of Westinghouse, Church, Kerr & Company, Inc., engineers and constructors, New York, and Dwight P. Robinson & Company, Inc., constructing and consulting engineers, of New York.

The new company will be called Dwight P. Robinson and Company, Inc., and will occupy executive offices at 61 Broadway, and engineering and designing offices in the Grand Central Palace, 125 East 46th street, New York.

Mr. Dwight P. Robinson, president of the new company, was for many years president of the Stone & Webster Engineering Corporation, and formed his own company in 1918. He has had an unusually valuable experience in the design and construction of industrial plants, central power stations and hydro-electric plants, and his company, the principals of which left Stone & Webster with him, has specialized in work of this nature. At the time of the merger the Robinson Company had large power plants under construction for the Duquesne Light Company, at Pittsburgh, the Penn Public Service Company, at Johnstown, Pa., and others.

Westinghouse, Church, Kerr & Company, Inc.—established thirty-six years ago—has specialized in the design and construction of industrial plants of all kinds, railroad shops and terminals, and industrial power plants.

As the activities of the two companies were largely supplemental—each making its own specialized contribution to the new company—it is believed that the new organization will become one of the largest and most successful in the construction and engineering business.

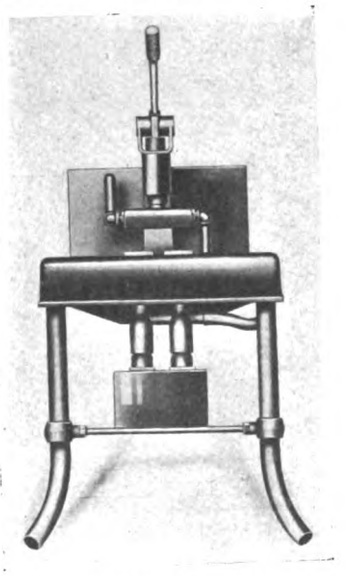
Atkins Slotting Machine

Alfred Herbert, Ltd., 54 Dey street, New York City, have announced the production of the Atkins 6½-inch Slotter. The machine is cone-driven and is equipped with automatic feeds to both slides and circular table. This table is of large diameter, graduated in degrees, and has a locking device with twelve divisions. The general specifications of the machine are described in a bulletin issued by the company and may be obtained upon request.

Electric River-Heating Forge Developed

A new electric rivet-heating forge is being produced by the United States Electric Company, New London, Conn. It is intended for use in shipyards, boiler shops and in connection with steel structural work—in fact, wherever it is necessary to use hot rivets from ¾ inch to 1¼ inches in diameter. It is stated that for these sizes from 7 to 15 seconds is required to attain the proper heat.

The electrodes of this heater are arranged to heat two rivets at a time, and about four rivets are supplied a minute



Electric Rivet Heating Forge

at the proper heat and free from scale. The pan of the forge is designed to hold a keg of rivets. These are fed to the machine by hand. The conductor is operated by means of a foot or hand lever which brings the electrode in contact with the point of the rivet. When the rivet is adequately heated the pressure on the lever is released.

The forge may be supplied with a set of electrodes and twenty foot leads to be used in heating loose rivets in place, after which they may be driven up tight.

Equipments are available in all sizes and for use with 110 and 220 volts alternating current.

The St. Louis sales office of the Standard Underground Cable Company, Mr. E. J. Pietzcker, manager, was removed a short time ago from the Security Building, where it has been located since 1897, to the Arcade Building.

More Zinc Used in Government Paints

Standard paint specifications under which the Government is recommended hereafter to purchase paints for use of the Army, Navy and other departments, have been determined upon by the Inter-Departmental Committee for the Standardization of Paint Specifications.

Two features are significant: First, the importance of zinc oxide in increasing proportions is recognized by paint technologists on the committee; second, the latitude afforded by the specifications permits a large field of paint manufacturers to compete for Government business. The pigment proportions of the specifications follow:

	Minimum Percentage	Maximum Percentage
Zinc oxide	30	55
Lead (total, including either one or mixture of carbonate and sulphate)	45	70
Inerts and colors	0	15

The purpose of these specifications is to provide for the purchase of prepared paints generally available in any section of the country, without requiring paint manufacturers to make up special batches. It is believed these specifications will include the formulæ of the majority of high grade paints on the market.

Evans's Flagship as Target

The old battleship *Iowa*, once the pride of the American fleet and flagship of the late "Fighting Bob" Evans, will be used as a moving target for modern dreadnaughts while being operated by powerful wireless apparatus. For six months she has been lying out of commission at the Philadelphia Navy Yard. The *Iowa* is about thirty years old, and of little further use as a fighting machine. If plans work out, she will move as if under her own steam with a full crew. The contrivance to be employed is that of John Hayes Hammond, Jr., for the wireless control of torpedoes from land.

New National House Organ

The Greenfield Tap and Die Corporation, of Greenfield, Mass., is issuing a new national or exterior house organ entitled "The GTD Helix." This firm has been publishing an employee's edition for two years, but has felt the need of a publication more national in scope—hence the new "GTD Helix." The name "Helix," which means "the path of a true screw thread," is a particularly fortunate choice in view of the firm's product—which consists of tools for cutting and gaging screw threads. The new magazine is 4½ by 5⅞ inches, and the cover is strikingly laid out in colors—the principal design representing a screw thread as seen inside a nut or tapped hole—the path of the thread or "helix" bringing the reader's eye down to the feature item for the month. The first number was published in April.

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Monitor Cylinder Oil.

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The engineers of Sun Company are always available for consultation regarding the most efficient type of oil to meet any condition.

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MAY USE DIESEL ENGINES

Submarine Boat Corporation To Build 9,000-Ton Freighters

The twenty new freighters which the Submarine Boat Corporation, 5 Nassau street, New York, has announced it will build for sale to private interests, will be the largest fabricated ships afloat, as they will have a deadweight register of at least 9,000 tons. While the builders are figuring on both steam and Diesel engines for the projected freighters, it is understood that there is a strong likelihood that some of them will be equipped with the internal combustion engines.

Theodore E. Ferris, 30 Church street, the well known naval architect, is the designer of the new boats. Before the signing of the armistice, he had completed the specifications for the larger sized ships. The designs were changed after the war, as it was believed that the most economical cargo ship would be around 9,000 deadweight tons, with a speed of twelve knots, and a draft of about twenty-five or twenty-six feet.

Against Ontario Ship Canal

WASHINGTON, April 14.—Construction by the Government at this time of a ship canal to connect Lakes Erie and Ontario is disapproved in a report sent to Congress to-day by the Engineer Corps. The report said the canal would not justify the expense until an outlet for deep-sea ships through the St. Lawrence had been provided.

Westinghouse Has Marine Department

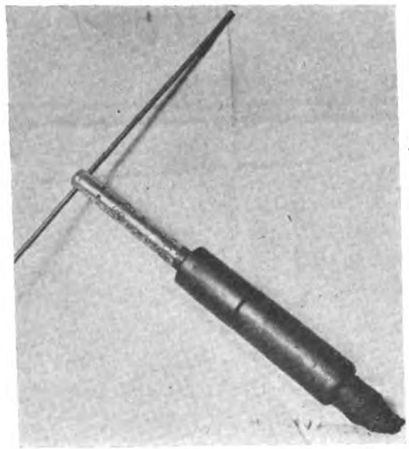
The Westinghouse Electric & Manufacturing Company has established a division of its Marine department at 165 Broadway, New York, to give the shipping industry the fullest service wherever knowledge, training and skill can be useful in the selection of ship propulsion machinery. The work of this division will be handled by Frank F. Boyd and Norris R. Sibley. Lt. Commander Boyd, U. S. N. R., was "Senior Engineer Officer" (chief engineer) of the *Jupiter*, the first electrically propelled ship of the Navy. Later he was transferred to the United States submarine base at New London, Conn., as chief engineer. He was in reality industrial manager. He is a member of the American Society of Mechanical Engineers, and kindred organizations.

During the war with Germany, prior to January, 1918, Mr. Sibley served as chief engineer in the Army Transport Service. Prior to that he had served in several of the lines of the Merchant Marine and for a time covered the marine field for New York newspapers and assisted in compiling "The Blue Book of Facts," a book on marine engineering. Leaving the Army Transport Service, he became connected with the Westinghouse Electric & Manufacturing Company. He is an alumnus of the Massachusetts Nautical School, a member of the National Marine League, and various marine engineering associations.

Convenient Electrode Holder

A patent has recently been allowed to L. A. Eckenrode, Park avenue, Chambersburg, Pa., on an electrode holder that eliminates the usual spring clip of such devices.

It is claimed that the holder cannot be injured by accidental contact. In practice one member of the holder rotates on the other, actuating a plunger against the electrode. A quarter turn of the handle



Electrode Holder Eliminates Spring Clip

is sufficient to clamp the rod in place, so that springs are not needed. The cable connection is also of special design

Further information of this device is available at the above address.

New Name in Oxy-Acetylene Field

The Oxweld Acetylene Company, of Newark, N. J., and Chicago, has recently extended its manufacture of oxy-acetylene apparatus and equipment to include "Eveready" welding and cutting outfits. "Eveready" is a new name in the field, but excepting for certain refinements of design, the apparatus has been used extensively in the metal-working trades for several years under the name of "Prest-O-Lite."

The new name was adopted to suggest the ready convenience, adaptability and general-purpose uses of the equipment. The apparatus is designed to be used exclusively with compressed acetylene in cylinders, thus providing for the welder and cutter a compact and complete portable outfit.

"Eveready" outfits and supplies are moderately priced, and are sold through distributors direct to the retail trade.

Flour Shipments Waiting

Four hundred thousand tons of flour intended by the Food Administration for shipment to the Atlantic Coast remain in Pacific Coast ports for shipment for June 1, when the Food Corporation ceases to function. Of this amount 200,000 tons remain to be shipped out of the Columbia River.

TO ENTER FOREIGN TRADE

Old Dominion Line Will Have Mediterranean Service

The Old Dominion Steamship Line, which recently announced that it was going out of the coastwise trade between this port and Chesapeake Bay points, is preparing to enter the Mediterranean and Black Sea service with a fleet that finally will comprise twenty steamships, including six passenger carriers, one being unusually large and all modern.

H. B. Walker, president of the Old Dominion Line, which will not change its name, made the announcement.

The Old Dominion service has been in existence fifty-three years. The line will retain its piers at the foot of Beach street, North River, extending them to suit the larger ships it will acquire.

Columbian's Cafeteria

The Columbian Rope Company, of Auburn, N. Y., has opened one of the finest and best equipped employees' lunch room in this section of the country. The building is 70 by 100 feet, one-story high, with an ample supply of fresh air and ventilation, and a seating capacity of 450.

The company puts up a 25 cent lunch which includes choice of meat order, bread, butter, coffee, choice of a vegetable and of dessert; home-made muffins, rolls, etc., will be served. In addition, there will be a regular cafeteria service at actual cost. Those who carry their own lunch may eat at the tables and purchase coffee, tea, milk, etc., to fill out their lunch. Extra large "man-size" coffee mugs have been provided.

For the convenience of employees, a full supply of cigars, tobacco, chocolate, etc., is provided. Smoking will be permitted from 12:30 to 12:55 o'clock, which is much desired by the employees, as they are not allowed to smoke or carry matches within the grounds.

"Eldo" Incorporates

Ellenwood & Doyle, of 29 Great Jones street, New York City, who have just completed their first year as distributors of tin plate, black and galvanized sheets, copper, brass, zinc, etc., in order to provide additional capital for their rapidly expanding business, have decided to incorporate under the laws of New York State for $150,000 8 per cent preferred stock and 1,000 shares of common stock of no par value. The success which has resulted from their initial efforts, and which necessitated the leasing of one of the Bush Terminal buildings for warehouse accommodation, is no surprise to their many friends. The system of profit sharing inaugurated by this company cannot but attract and develop the best men available in this field, and the same generous spirit which pervades their dealings with their employees will not be withheld from the shareholders.

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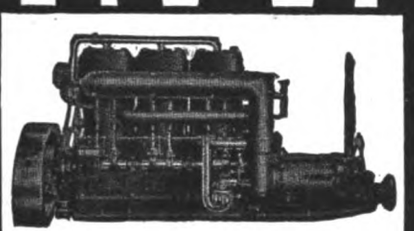
POWER



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PERSONAL AND BUSINESS NOTES

Canadian offices of Alfred Herbert, Ltd., New York City, have recently been opened in Toronto in the Board of Trade Building, 31 Yonge street. J. C. Blair will be in charge.

The general and Philadelphia District sales offices of the Tacony Steel Company have removed from the works to the Franklin Bank Building, 1417 Sansom street, Philadelphia.

Mr. J. L. Edwards now represents the Mahr Manufacturing Company of Minneapolis, Minn., makers of oil-burning equipment, in Western Pennsylvania, with an office at 498 Union Arcade Building, Pittsburgh. Mr. Edwards succeeds Mr. J. S. Longnecker.

Large foreign orders, together with the demand from American railroads, shipyards and industrial plants, have been responsible for extensive improvements and additions in the Baird Pneumatic Tool Company's plant at Independence, Mo., near Kansas City, in which latter city are the general offices of the company. Another battery of automatic lathes and a giant planer have recently been installed to take care of the increased foreign demand for labor saving machines. China and Japan head the list of foreign buyers, with a constant stream of inquiries from Europe.

Mr. J. A. Ridley, a superintendent of fitting, launching and finishing mine planters at the Fabricated Ship Corporation, Milwaukee, Wis., since May, 1919, has been appointed manager of the yard at Kewaunee, which is being equipped by the Wisconsin Shipbuilding & Navigation Corporation, 216 West Water street, Milwaukee. Mr. Ridley had many years experience in practical shipbuilding in England, before coming to the American Lakes in 1910, and has a South Kensington certificate in naval architecture.

The Baird Pneumatic Tool Company of Kansas City, Mo., will exhibit its full line of compression pneumatic tools and its flue rattler at the Master Mechanics' Convention at Atlantic City, June 9 to 16.

The Metal & Thermit Corporation, 120 Broadway, New York City, in order to take care of its increasing business in the New England States and Canada, has appointed Mr. James G. McCarty manager of its Canadian branch, with headquarters in Toronto, and has transferred Mr. Robert L. Browne from its New York office to Boston, where he will have charge of all sales in the New England States.

The Baker R. & L. Company, Cleveland, Ohio, announce an expansion of their business which will allow for greater production of Baker industrial trucks and Raulang bodies. The change includes the sale of the electric passenger car business to Rauch & Lang, Inc., of Chicopee Falls, Mass. The Baker R. & L. Company built the first electric road vehicle offered for sale on the American market and fifteen years ago attracted much attention with the Baker Torpedo Kid, an electric racing car that established the world's kilometer record, and attained a speed of 128 miles per hour at Ormond Beach, Fla.

The Brown Instrument Company, of Philadelphia, is erecting two new buildings, one for the manufacture of recording thermometers, the second a research department, at a cost of $100,000. These facilities will enable the company to materially increase the output of Brown pyrometers and recording thermometers.

The Independent Pneumatic Tool Company, Chicago, Ill., announces with profound sorrow, the death of Mr. Roger C. Sullivan, Chairman of the Board of Directors, on April 14, 1920.

Mr. A. C. Wilkie, having resigned from the Emergency Fleet Corporation as manager of the Ship Construction Division, has opened a Philadelphia office at 1619 Chestnut Street, for Eads Johnson, M. E., Inc., of New York, Consulting Marine Engineers.

The Midwest Engine Company has recently completed the erection and equipment of a centrifugal pump and turbine testing laboratory at the Hill Pump Division, Anderson, Ind. This laboratory has facilities for testing centrifugal pumps up to 48 inches capacity, and the various types of reciprocating pumps handling up to 25,000 gallons per minute, produced in their works. Five units of the Midwest-Wait steam turbines may be handled simultaneously. A 2,000-square foot surface condenser is used for condensing units, and high pressure boilers and superheaters supply steam at any desired pressure or degree of superheat.

Charles Gitlan, 72 Trinity Place, New York City, an expert on non-ferrous metals and ores, is in the market as a buyer or seller for shipyards, boiler makers, engineers, tin plate makers, and other consumers, giving personal attention to all inquiries.

G. E. Stoltz, general engineer, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been appointed engineer in charge of the steel mill section, and W. E. Thau has been made engineer in charge of the marine section of the engineering department.

Ray T. Middleton has resigned as general sales manager of the Standard Steel Castings Company, of Cleveland, to become vice-president and director of sales and advertising for the Kelly Metals Company, of Chicago, Detroit and Los Angeles. Mr. Middleton's headquarters will be Chicago, where The Kelly Metals Company will, at an early date, establish its principal production plant. The company will continue its present plant in Duluth and Los Angeles, and later establish a third branch plant at a point to be selected in the East.

All standard sizes of rivet sets are being manufactured by The Ward Tool & Forging Company, Latrobe, Penn. The company is also prepared to supply special rivet sets according to any specification.

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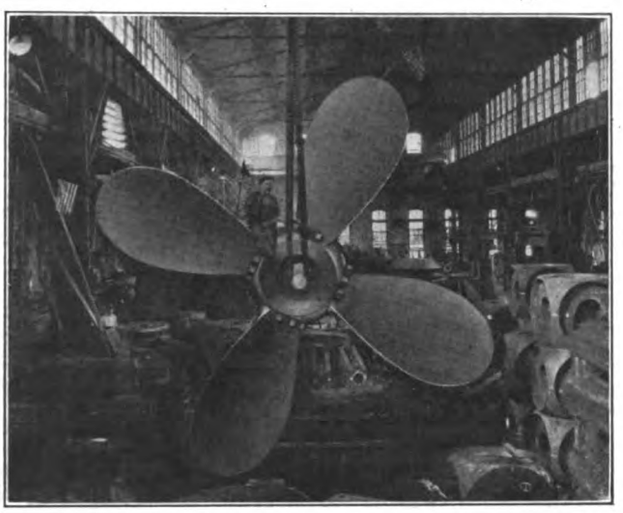

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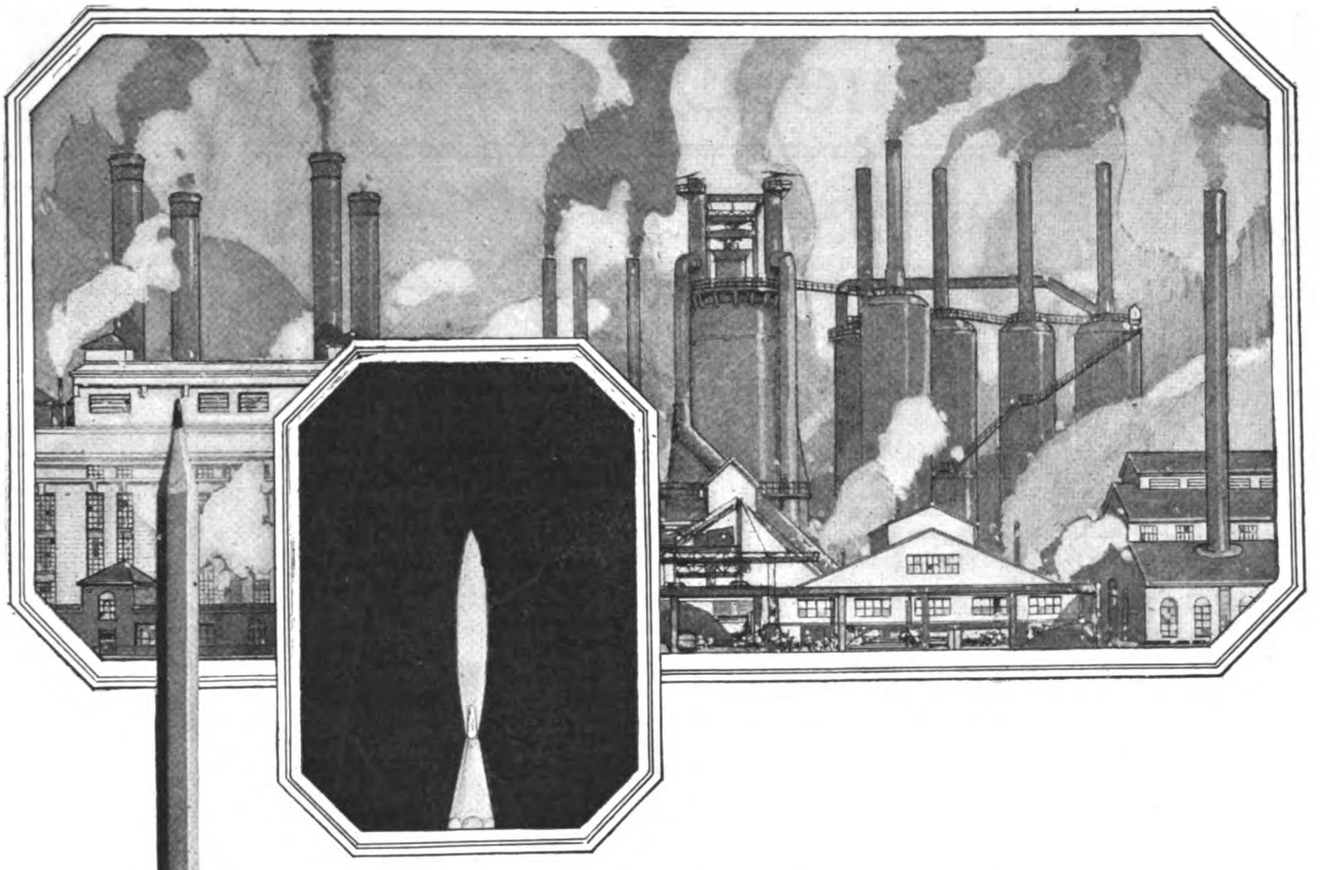

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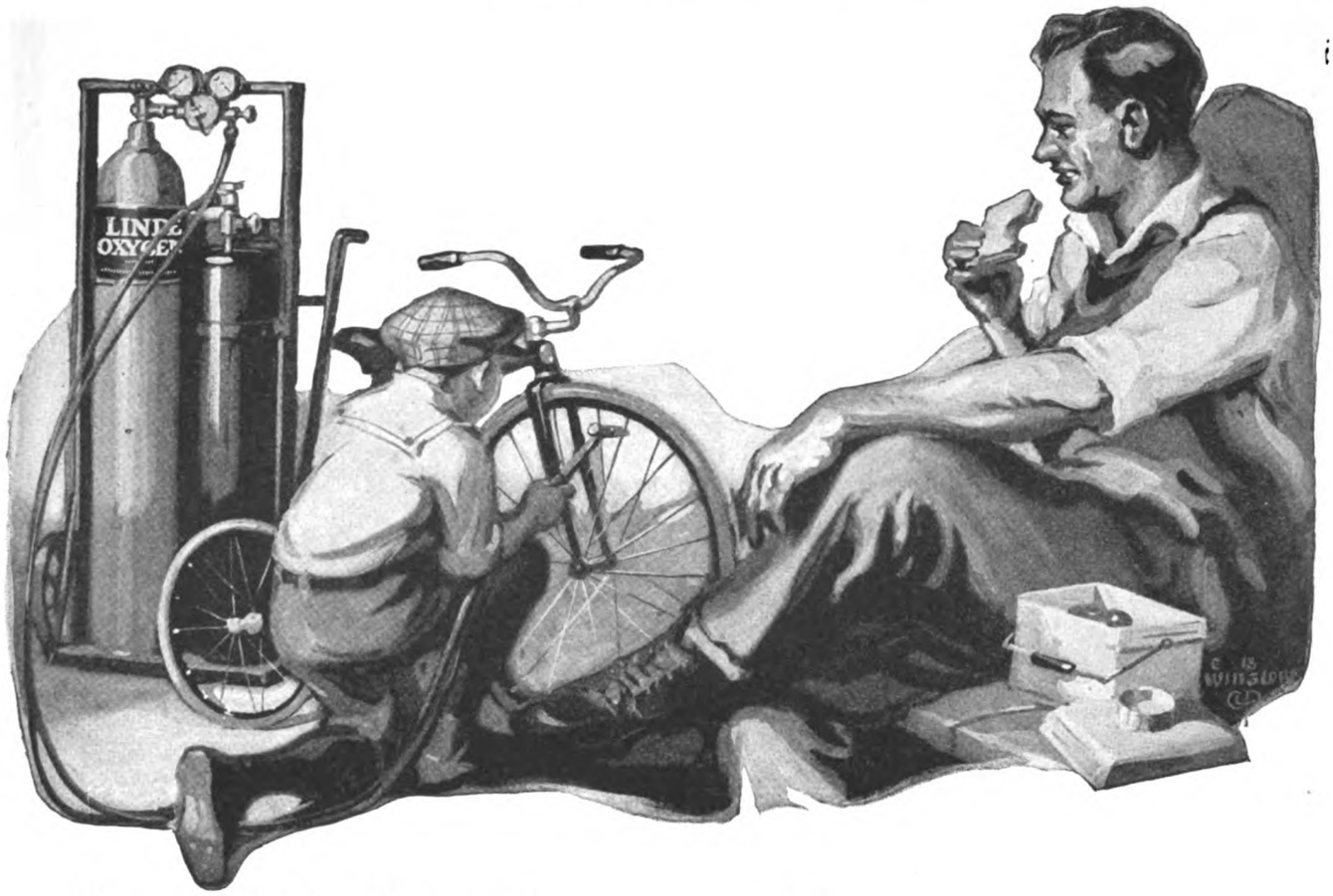

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Shipbuilding In 1921

AMONG the special features in the Annual Shipbuilding Number of MARINE ENGINEERING to be published in January, will be a forecast of the prospects for shipbuilding in 1921. This forecast will be based upon a thorough canvass of the shipbuilding and shipping industries in the United States and will cover not only the probable volume of tonnage to be constructed but also the probable demand for vessels of various types.

Other features of this issue will include statistics covering the output of American shipyards in 1920, a review of the shipbuilding and ship repairing facilities in the United States, articles on the trend in naval architecture and marine engineering and special branches of shipbuilding such as classification, welding and the development of motorship building.

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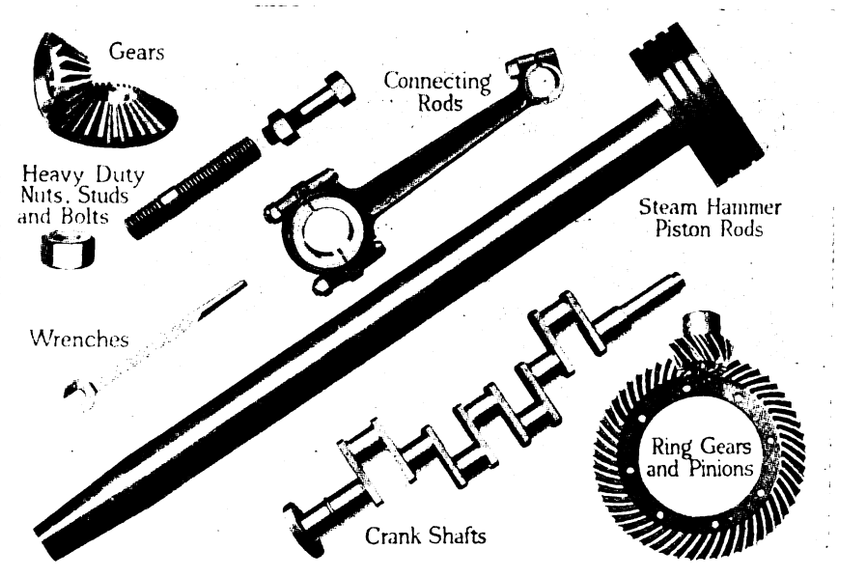

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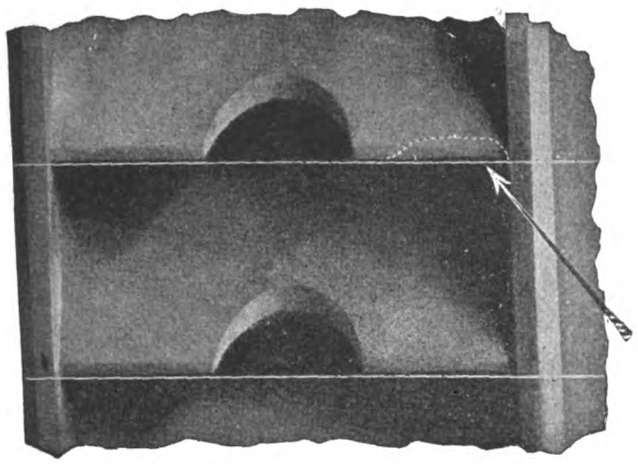
Imperceptible Bucket Wear After Five Years



No. 1. View of wheel bucket after 5 years' constant service (Full Size).

MULTIPLY by twenty the fastest speed that man has ever traveled on the face of the earth and you will approximate the speed at which steam issues from the nozzle in a single stage impulse turbine; a speed almost equal to the velocity of a bullet as it leaves the muzzle of the modern army rifle. In spite of this fact a Terry wheel which has had five years continuous operation emerges with such a slight amount of wear that it is scarcely perceptible to the unaided eye.

To show this wear it was necessary to draw a straight line across the photograph (see illustration at the left). If, however, in the course of service the blade had worn back as far as the dotted line there would have been little or no change in the efficiency of the turbine.

Bulletin 25 explains this fully and shows many other reasons why your maintenance cost will be exceptionally low if you

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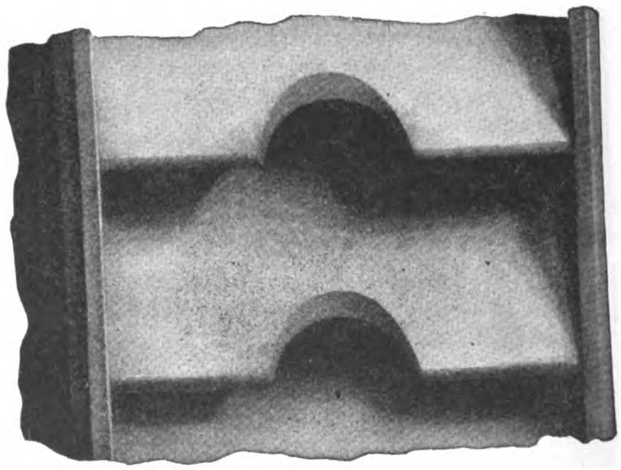

No. 2. View of bucket in a new Terry Wheel (Full Size).

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THE TERRY TURBINE

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He was so full of his troubles that he spilled them all over that Magnesia salesman.

The salesman had a hunch. It was several years since the pipes and boilers in this plant had been covered. Meanwhile every boiler had gradually been forced until it was giving nearly three times its rated capacity.

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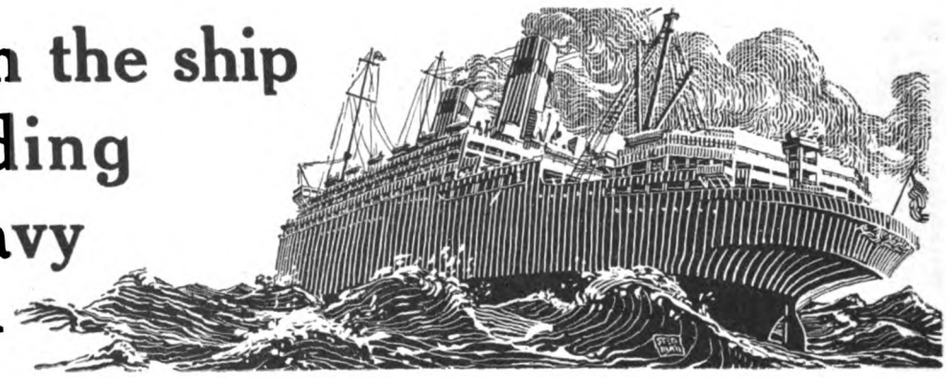
When the ship is riding a heavy sea—



every part is put to the severest test. It is then that failure of any of the innumerable tiny tubes in the condenser may mean disaster. If condenser tubes fail, salt water gets into the boiler feed. The boiler foams and steams badly. Salt in boiler feed water soon reduces the ship's speed and is liable to stop its operation altogether.

On land the power plant can be shut down to replace defective condenser tubes—although this is costly.

But on a high sea there can be no shutting down of the ship's plant.

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Life Preservers, Wire Rope Hawsers, Hoisting and Rigging Wires

We carry largest stock of ship supplies of all kinds

Send for Our illustrated catalog

We carry full line of "WEW" Bronze and Iron Body Valves—The "WEW" is the heaviest and best Marine Valve Made

Immediate Deliveries made by Our Own Motor Trucks

WILLIAM E. WILLIAMS

62 FRONT STREET. NEW YORK

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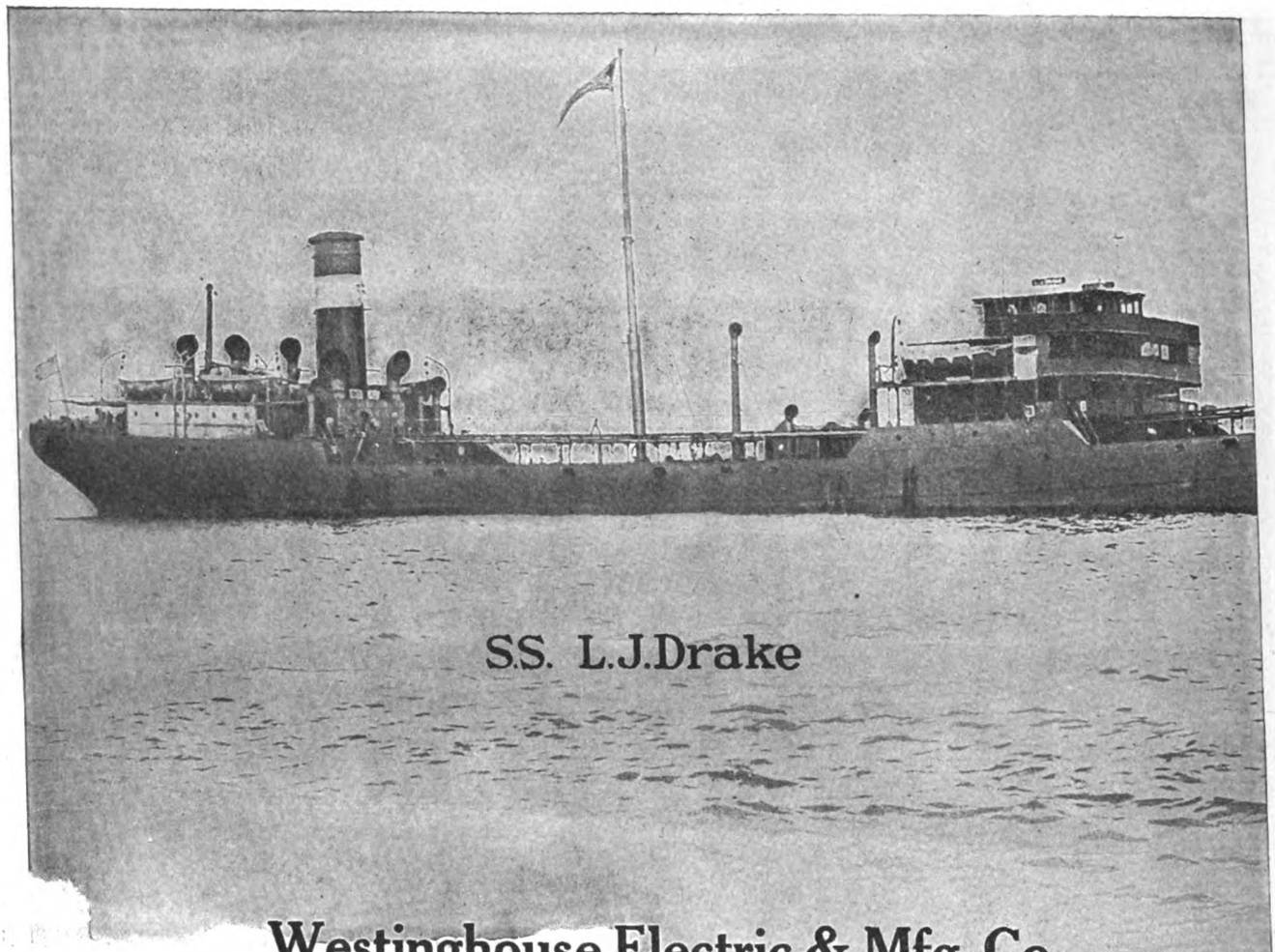

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Sales Offices
In All
Large American Cities

Special Pacific Coast Representatives
Hunt, Mirk & Company,
San Francisco

Westinghouse

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S.S. L. J. Drake

The Tanker L. J. Drake was commissioned October 15, 1918, and since that date has a record of practically continuous service. Up to Feb. 15, 1920, she had traveled a distance of 75,000 miles, seldom remaining in port more than 36 hours.

This ship is 8700 tons capacity, 424 feet overall, 54 feet beam, 30 feet depth. She is engined with Westinghouse Cross-Compound Turbines and Double Reduction Gears of 2500 shaft horsepower, the reduction being from 3600 rpm. on the turbines, to 90 rpm. on the propeller. The vessel is driven at a speed of 10½ to 11 knots.

The L. J. Drake has averaged 1 lb of oil per shaft horsepower total fuel consumption, including all auxiliaries, heaters, etc.

Those acquainted with the fuel consumption and bunker space required by coal burning ships propelled by reciprocating engines will be able to appreciate the marked improvement in economy, dependability, and earning power effected by the use of Westinghouse Geared Turbine Propulsion Machinery.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa. Washington, D. C.

Sales Offices in All Large American Cities

Special Pacific Coast Representatives
HUNT, MIRK & COMPANY
San Francisco

W
WESTINGHOUSE ELECTRIC

Marine Equipment

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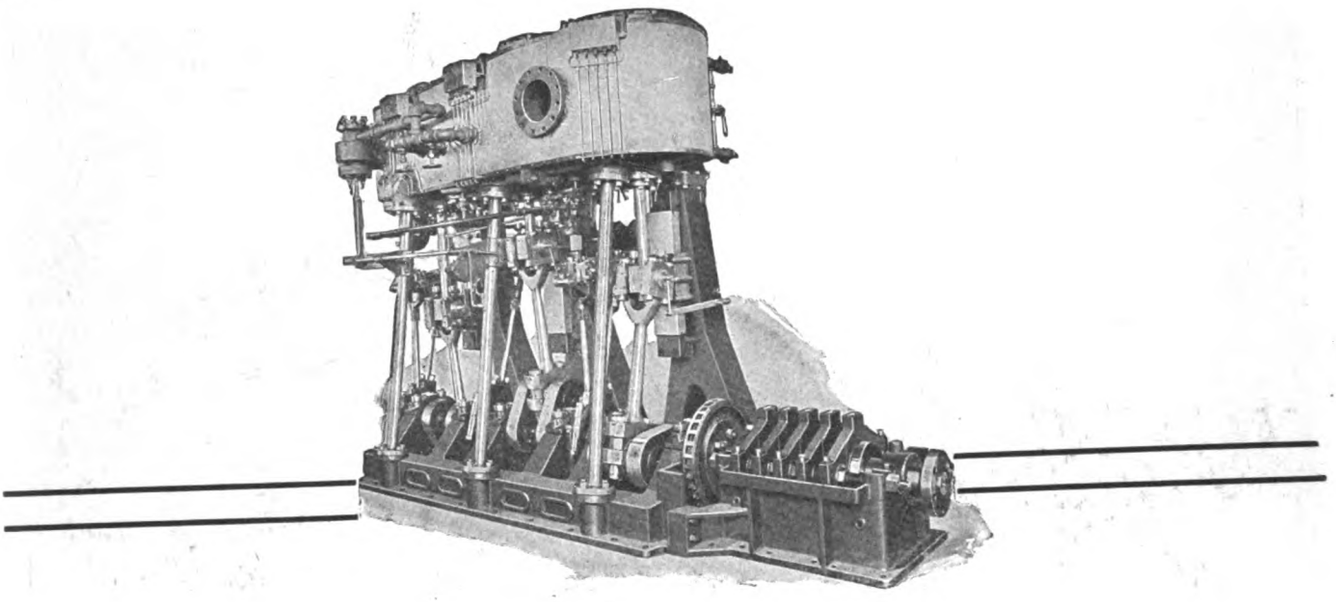

THE Kearfott Organization includes a staff of engineers of long experience in selecting and designing standard machinery equipment for ships.

The selection of mechanical equipment for a vessel, small or large, cannot be made a haphazard matter if ultimate economy is sought. Equipment of various makes must be combined to form a unit which weighs as little as practicable and is as inexpensive as is possible, without the sacrifice of quality. Auxiliaries must be properly balanced in relation to the main propelling machinery.

The most satisfactory means to assure the proper choice of machinery is to take advantage of the services of the Kearfott staff of engineering experts, whose advice is given gratuitously. The Kearfott Organization is prepared to recommend complete marine machinery or to replace, repair or remodel existing equipment. It is the exclusive representative of many prominent manufacturers of marine equipment.

Kearfott possesses at all times latest detailed knowledge of the standard products of the Country's shops. Before you design and have built any piece of machinery—make sure that Kearfott does not know of some standard equipment that will serve equally as well and cost far less.

Asking Kearfott to quote involves no obligation, and will probably result in a large saving for you.

KE-23

Kearfott Engineering Co., Inc. 95 Liberty Street New York

KEARFOTT

Frederick D. Herbert, President

MARINE MACHINERY

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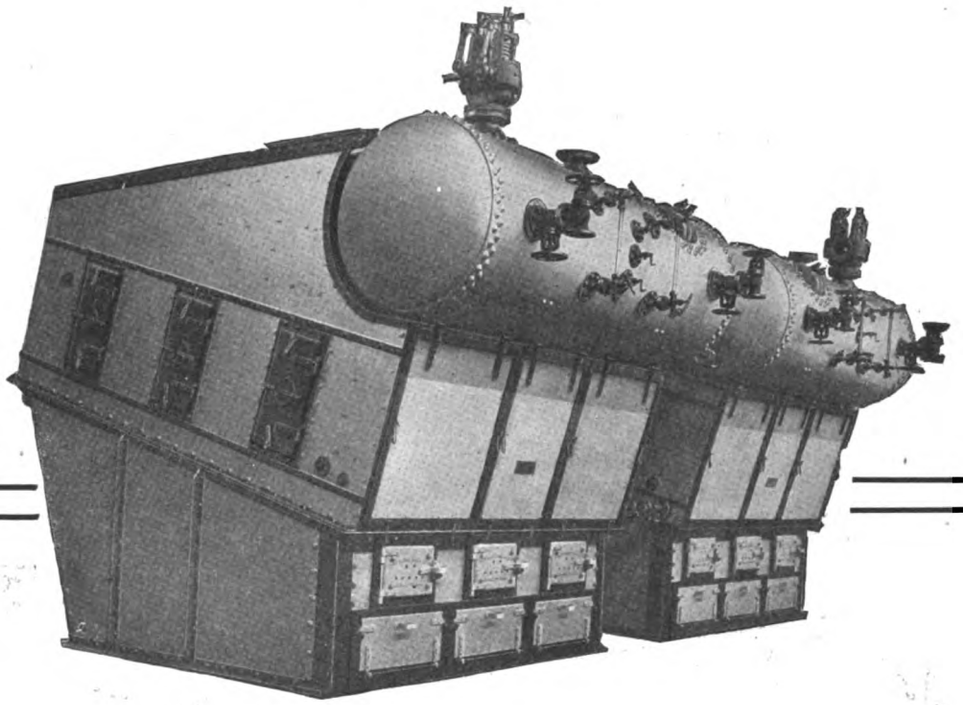

THE ordinary way of making a boiler is familiar to you. Fit is largely a matter of heavy sledge and brawn; the boiler is subjected to severe strains before a drop of water enters it.

Ward Boilers are fitted together like an engine. The headers are machined to take the I beam stiffeners; the large drum is fitted to the front header; stay-bolts and nipple connections are entirely absent; the steel tubes are straight.

Ward boilers are free from strain, and are consequently longer-lived. Add the feature to the Ward advantages of lower first cost, upkeep, weight and greater capacity and economy, and you will have chosen the Ward as your Boiler equipment. Making a comparison of Scotch Marine and Water Tube Boilers for Marine use, in "International Marine Engineering," Mr. Jos. J. Nelis* recently wrote:

> *"Water tube boilers are approximately 10% more economical in fuel. The capacity of water tube boilers is so vastly in excess of Scotch boilers that no comparison is possible of this point."*

The advantages of water tube boilers are especially marked in the *Ward*, noted for its economy and capacity. We heartily recommend the use of Ward Boilers wherever possible.

*Formerly Senior Marine Engineer, Boiler Unit, Engineering Section, U. S. Shipping Board, E. F. C.

KE-24

The Charles Ward Engineering Works, Charleston, W. Va.

WARD BOILERS

WATERTUBE MARINE TYPE

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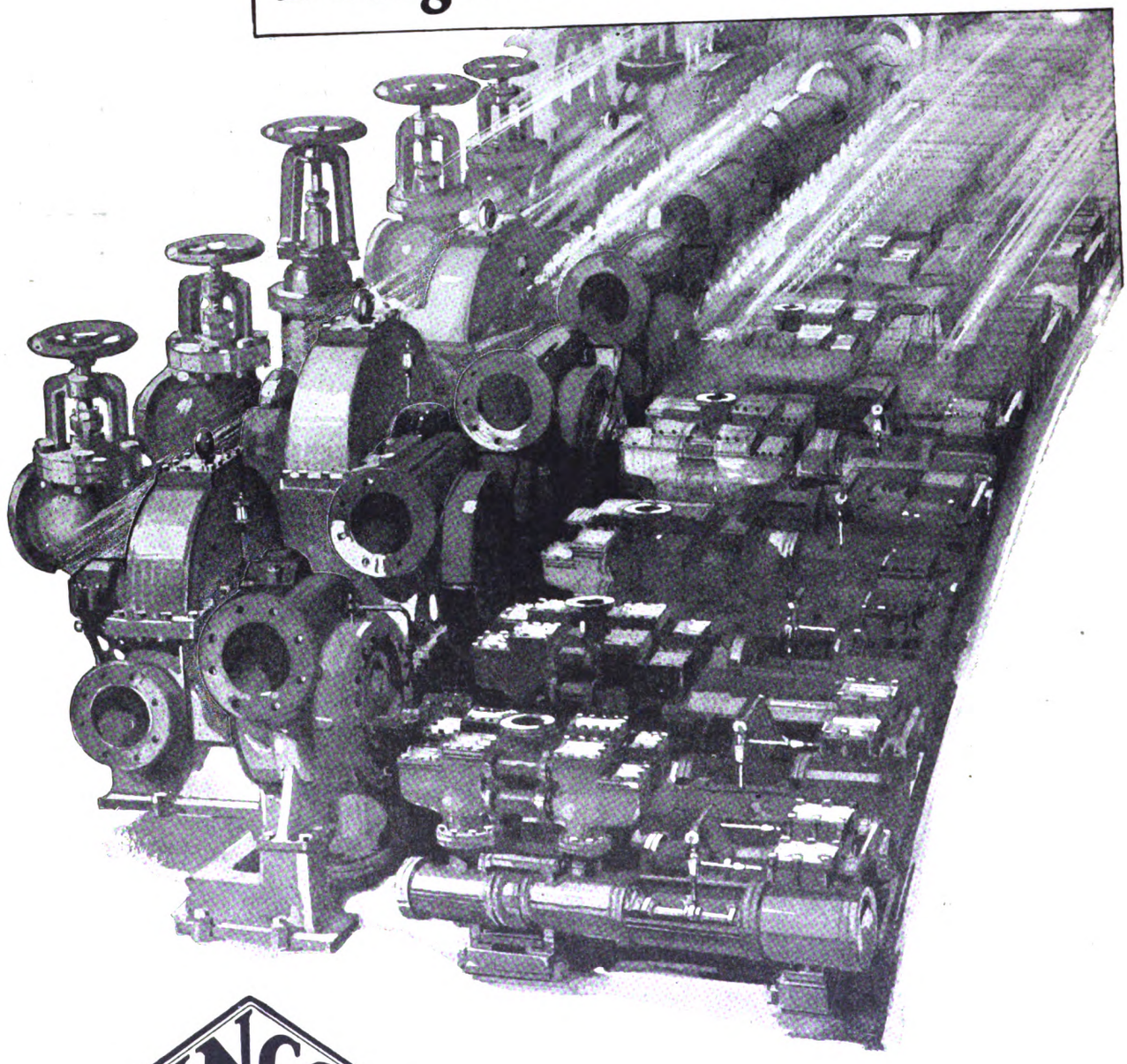
Design-time and Production



INCo

MOnel metal

THE INTERNATIONAL NICKEL COMPANY

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costs 75% Metal costs 25%

You pay 100% for service

. . . and but 25% for the metal that will measure its life

YOU get the service paid for . . . uninterruptedly, or in installments—with repeated renewals or repairs as the metals used stand up to the work.

Economically then, metals used in parts manufacture assume greater value than just 25% of apparatus costs.

Monel Metal, used in power plant apparatus as valve trim, turbine blading, pump rods and liners, etc., where resistance to high heats, erosion and corrosion is vital to service delivery, has more than justified its cost both as raw material and finished product. For the manufacturer by employing Monel has purged his apparatus of weaknesses that compel expensive repairs, costly shutdowns, and repetitive purchases of new machines.

The very toughness of Monel that in some cases will slightly raise manufacturing costs is pledge of its ability to deliver service continuously.

The name Monel is given to a line of metal products produced by The International Nickel Company from a natural nickel alloy—67% nickel, 28% copper and 5% other metals. These products include Monel blocks, Monel rods, Monel castings, Monel wire, Monel strip stock, Monel sheets, etc. The name Monel identifies the natural nickel alloy as produced by The International Nickel Company.

Monel Metal is absolutely untouched by rust, is strong as steel, resists the eating action of most alkalies and acids. Monel retains its strength under high heats that break down the very structure of most metals and successfully withstands the eroding action of high pressure and superheated steam.

THE INTERNATIONAL NICKEL COMPANY
43 Exchange Place, New York
The International Nickel Company of Canada, Ltd., Toronto, Ontario

Machine parts

INCO MONEL METAL TRADE MARK INCO NICKEL MARK

THE INTERNATIONAL NICKEL COMPANY

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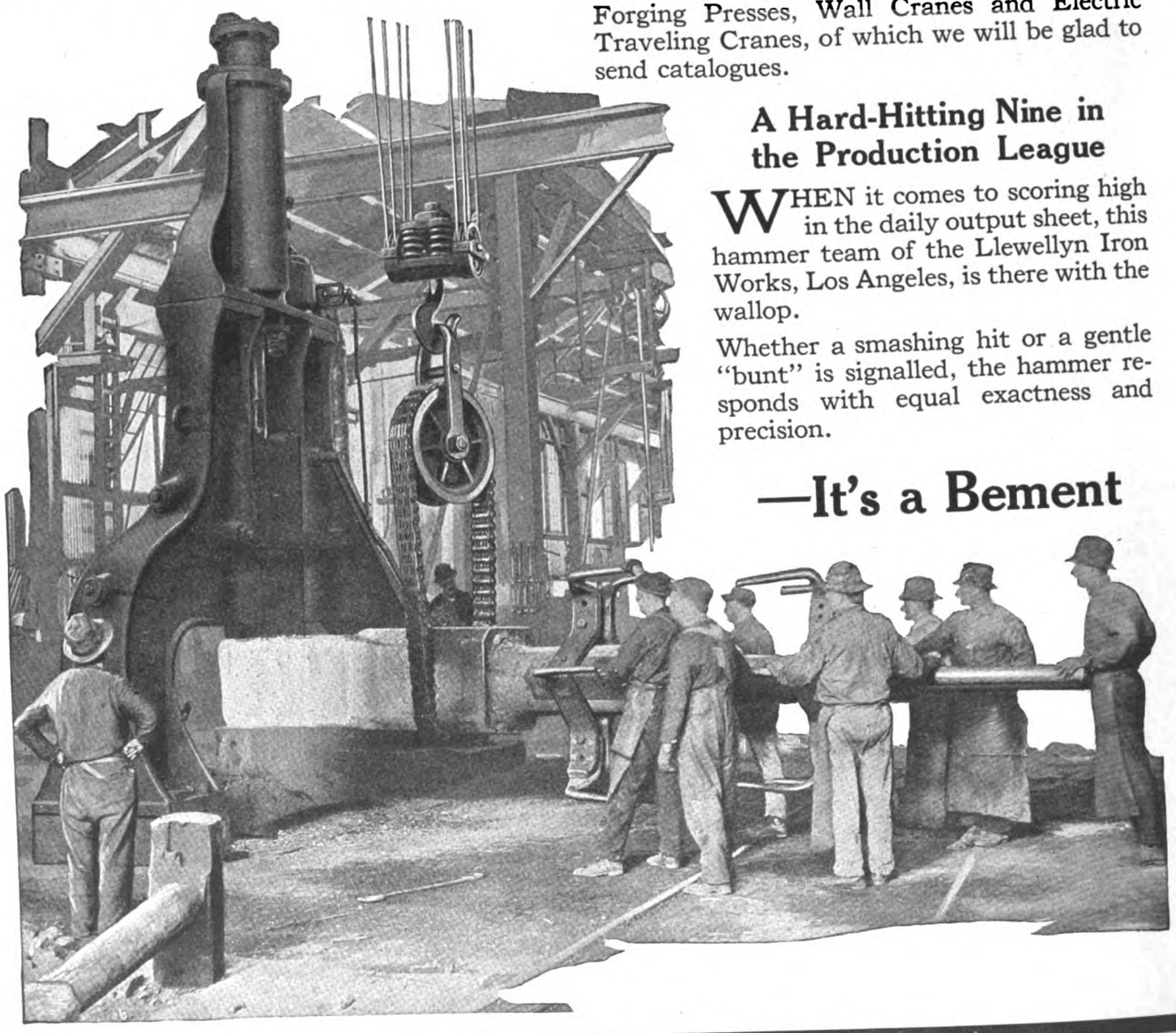
In the Forge Shop

N-B-P Steam Forge Hammers in single or double Frame, sizes up to 2,400 lbs., possess in ideal combination—enormous power, massive strength, simplicity and hair-trigger control. They are safeguarded against overtravel by internal buffer springs, which, together with the usual external springs, do away with all danger of knocking out cylinder heads through careless handling.

Bement Hammers include Steam Forge Hammers, single and double frame, up to 24,000 lbs. size; Steam Tilting Hammers from 500 to 3,000 lbs., and Board Drop Hammers from 300 to 1,500 lbs.

There's a Bement for every hammer requirement.

Other Niles Bement-Pond Forge Shop Equipment prominent in representative shops on both coasts includes Hydraulic Flanging and Forging Presses, Wall Cranes and Electric Traveling Cranes, of which we will be glad to send catalogues.



A Hard-Hitting Nine in the Production League

WHEN it comes to scoring high in the daily output sheet, this hammer team of the Llewellyn Iron Works, Los Angeles, is there with the wallop.

Whether a smashing hit or a gentle "bunt" is signalled, the hammer responds with equal exactness and precision.

—It's a Bement

NILES-BEMENT-

GENERAL OFFICES:

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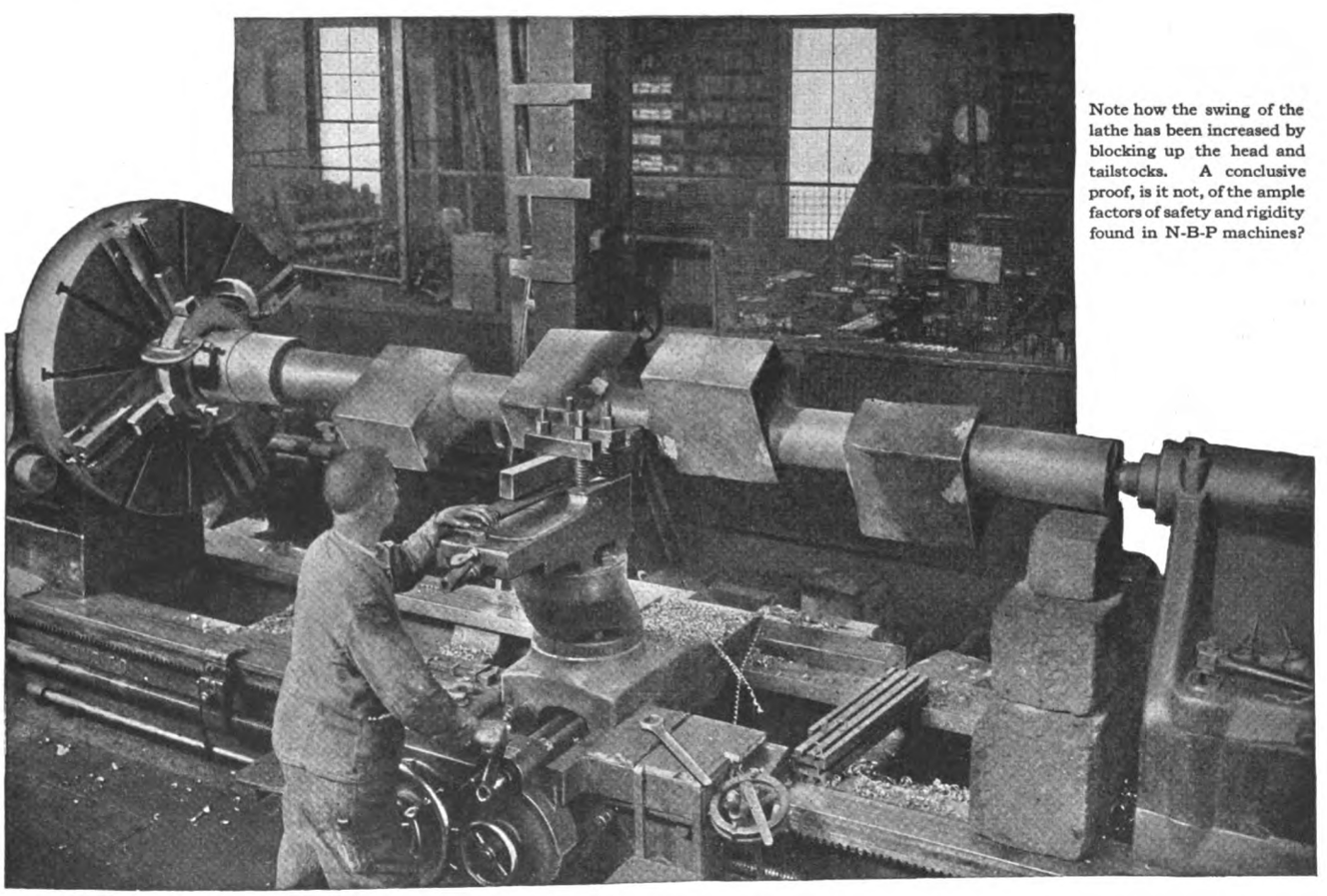
In the Machine Shop

ON this page is shown one of the N-B-P specialties, the Heavy Engine Lathe, used extensively for crank shafts, line shafts, thrust shafts, tail shafts and similar work. A lathe handling this work must withstand the severe strains put upon it, taking, as it does, the initial cut on rough forgings just as they come from the forge shop. The proof that N-B-P Lathes fill the bill in this respect lies in an unbroken record in the long established ship and engine works on both coasts. The installation shown on this page is doing duty in the Skandia Pacific Oil Engine Company's works at Oakland, California.

IN marine engine and machine shops, big work is the rule. The day's work includes crank shafts, rudder posts, rudder stocks and the large castings that make up the completed engine, comprising beds, cylinders, connecting rods, guides and valve gear. These units require heavy, well-designed machine tools. N-B-P Lathes, Planers and Boring and Turning Mills have always been designed with the purpose in view of having ease of operation just as pronounced in heavy models of the machines as in the lighter ones.



Note how the swing of the lathe has been increased by blocking up the head and tailstocks. A conclusive proof, is it not, of the ample factors of safety and rigidity found in N-B-P machines?

POND COMPANY
111 BROADWAY, NEW YORK

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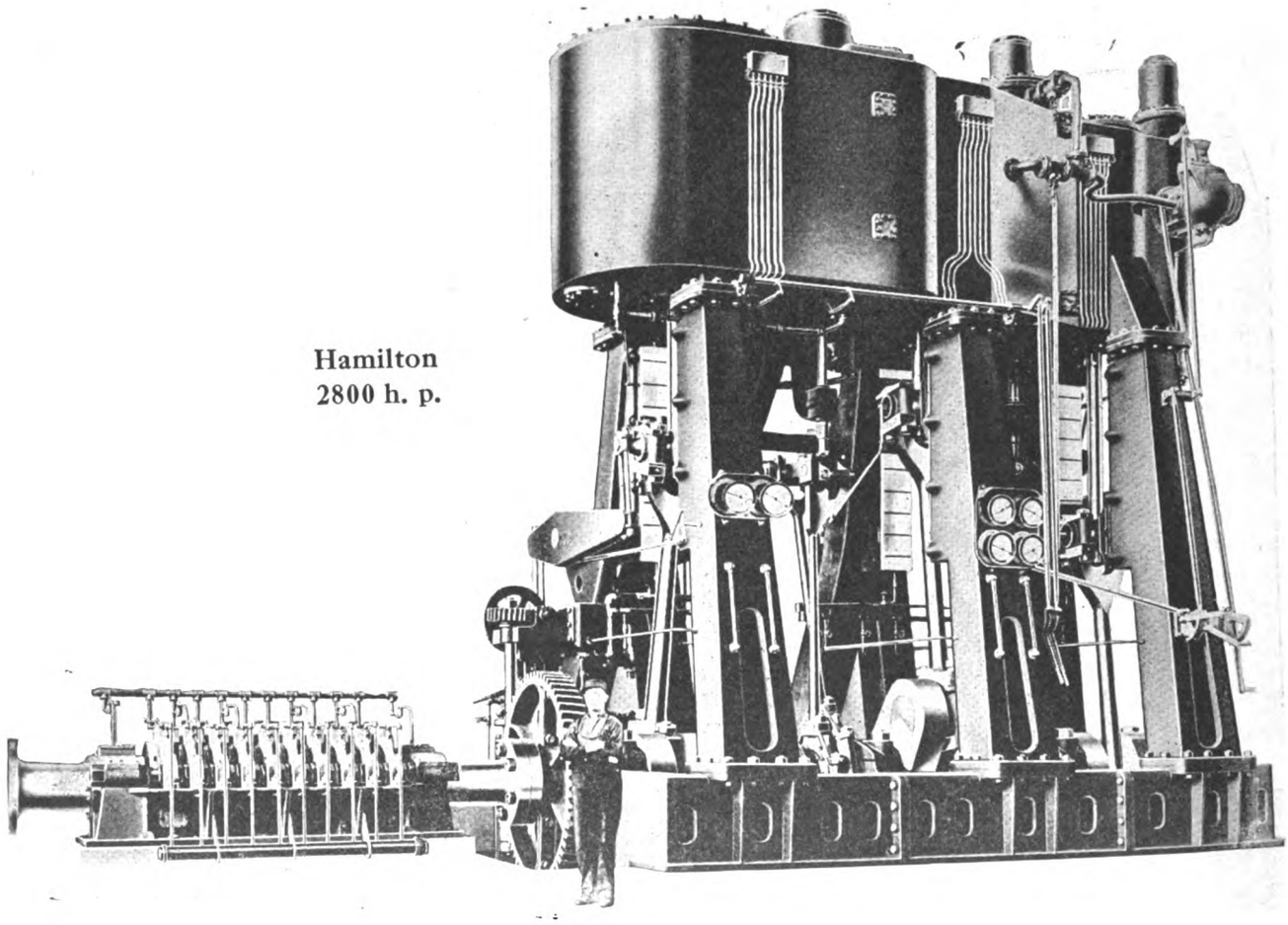
HAMILTON

MARINE 500 TO 5000 H.P.



Hamilton
2800 h. p.

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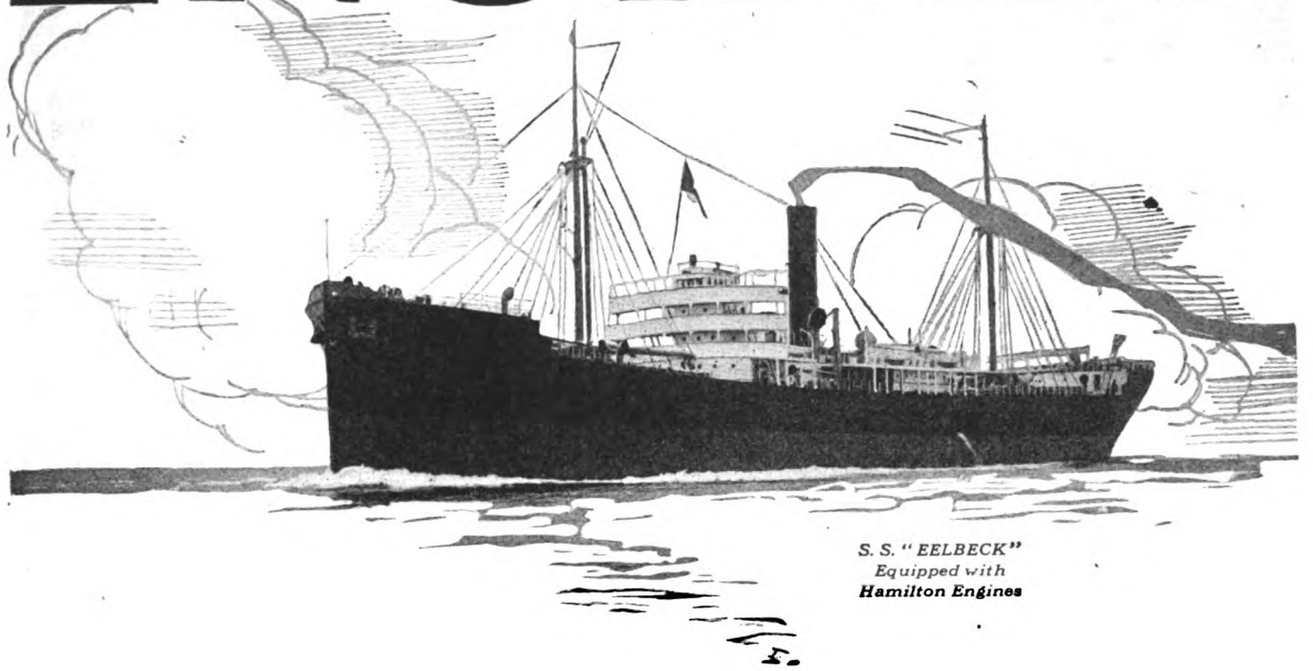
ENGINES



S. S. "EELBECK"
Equipped with
Hamilton Engines

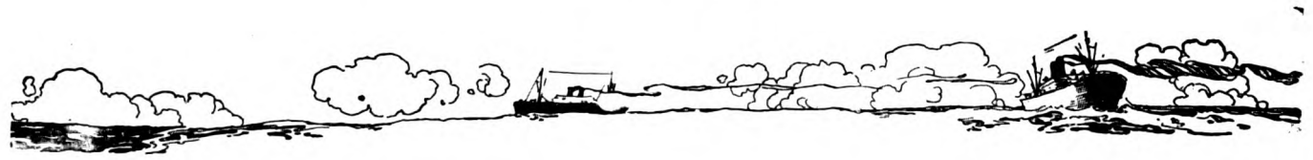
WE standardized the production of Hamilton Marine Engines to get uniform results, interchangeable parts, and strong, rugged engines of excellent finish and exceptional quality in every nut and bolt.

But our modern methods also enabled us to build quickly in the logical way—with a sequence of operation that completes an engine in the lowest possible time and at a minimum production cost.

To you it means engines of standard quality delivered according to schedule.

Write to Marine Engineering department for booklet showing detailed construction and full technical information.

THE HOOVEN, OWENS, RENTSCHLER CO.
Hamilton, Ohio



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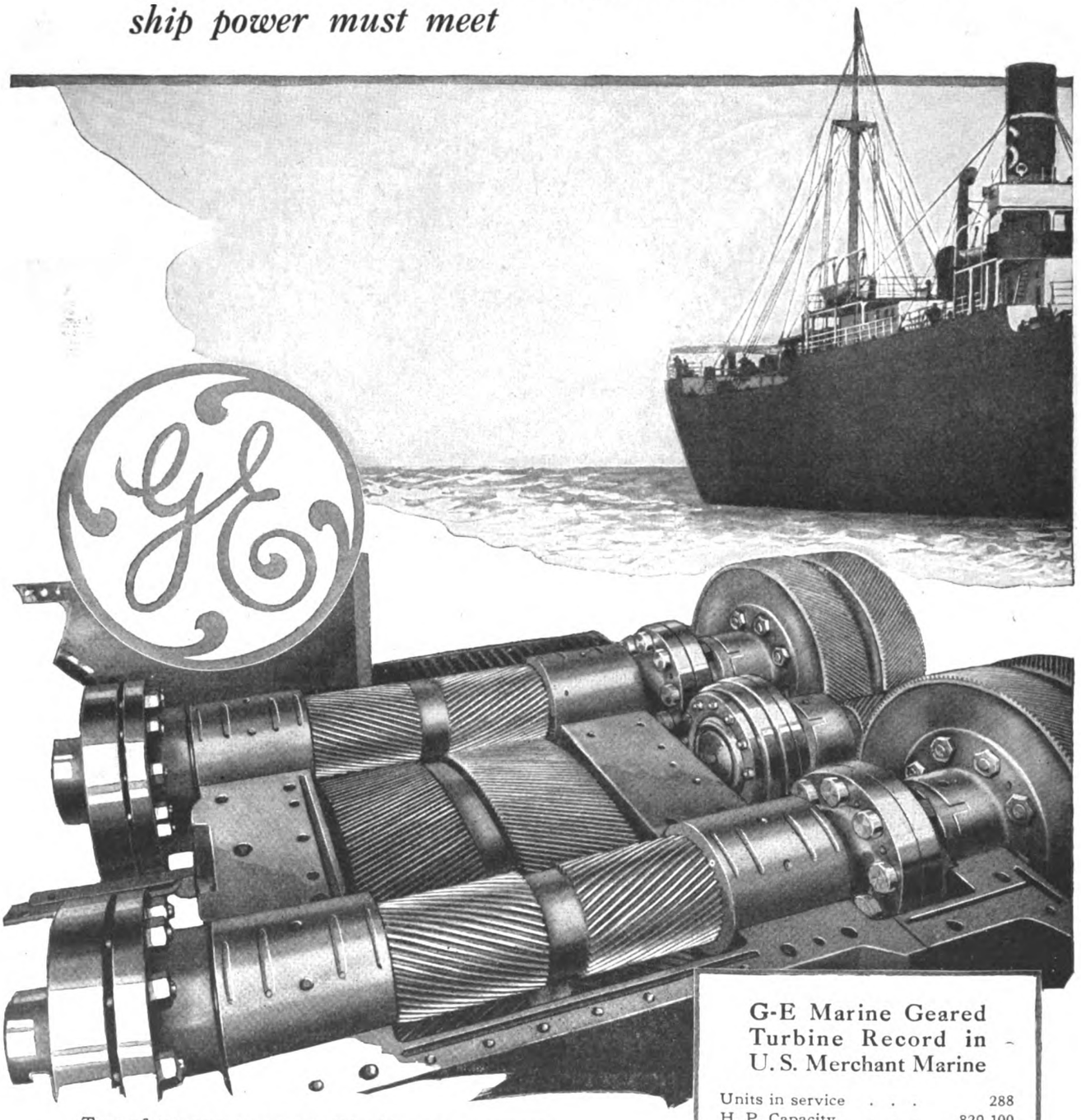
Consistent performance day in and day out, in storm and in calm is a requirement which good ship power must meet



Type of gear so successful on this ship—cover removed.

G-E Marine Geared Turbine Record in U. S. Merchant Marine

Units in service . . .	288
H. P. Capacity . . .	829,100
D. W. Tonnage . . .	2,588,529
Miles traveled	16,780,000

This nation had 144 Marine Geared Turbine vessels in service during the war—G-E equipment on 95 gave 81 per cent of the total service.

GENERAL

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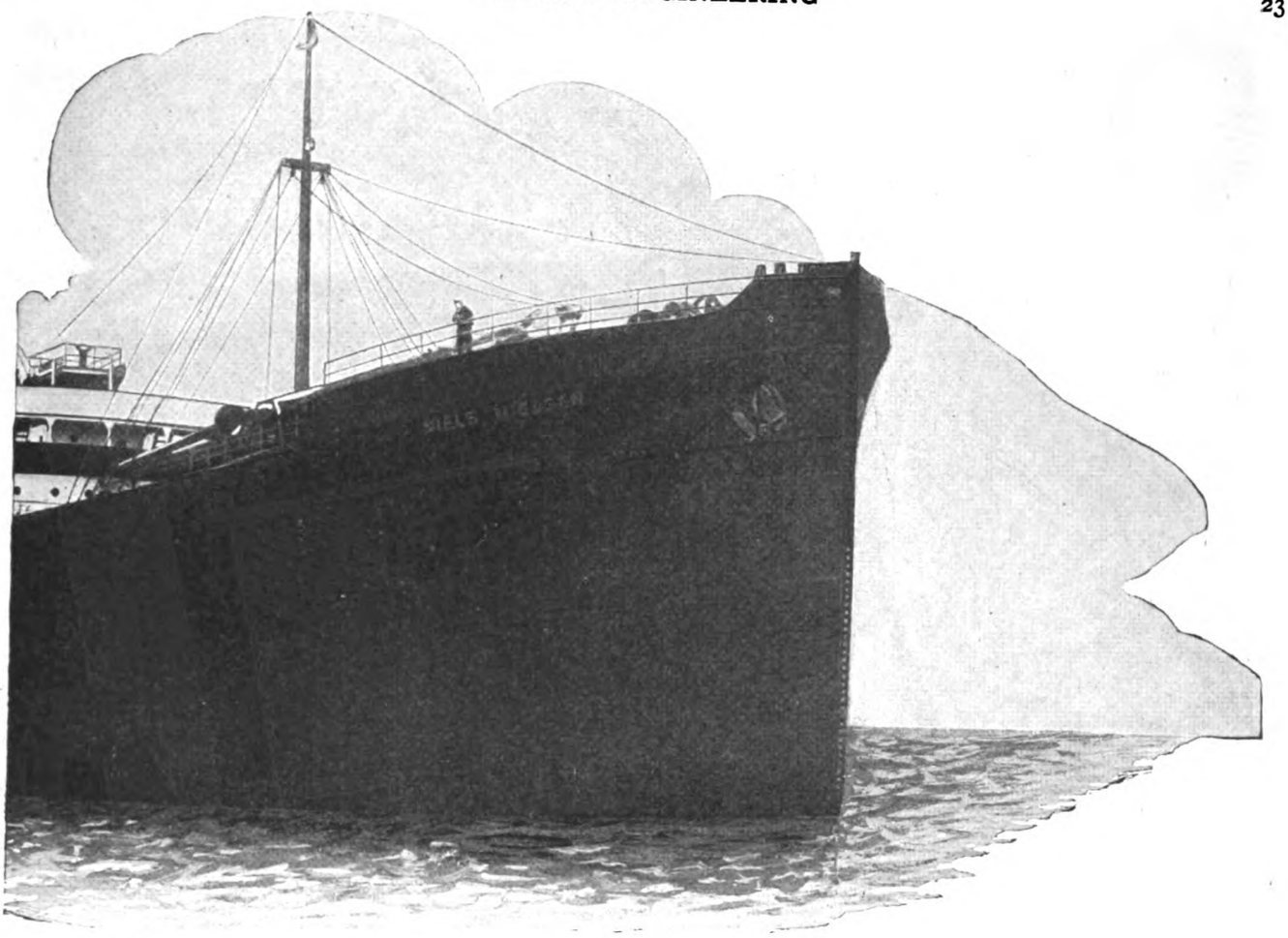

Niels Nielsen on her trial trip

The Atlantic tested this Propulsion Set

FOR more than three years, the Niels Nielsen has plied steadily between the eastern United States seaboard and ports of France and Spain. She is 409 feet long and has been averaging 12050-ton loads of general cargo.

In her engine room today, showing only moderate wear is a

G-E Curtis Turbine with Double Reduction Two-Plane Type Gears

which have propelled the boat 140,655 miles (August 1, 1920) since the very day she went into service.

The performance of propulsion machinery like this and of the duplicates driving those other long-service pre-war ships the Pacific, Eurana, Sucrosa and Hanna Nielsen, has won the confidence of skeptical, conservative men of the sea for the 1920 type of G-E Two-Plane Type Marine Geared turbines. This type embodies all the strength of its predecessor plus lowered tooth pressure, better tooth design, greater weight, less length and a more perfect uniformity of load distribution due to slip type pin couplings.

26-17

E L E C T R I C

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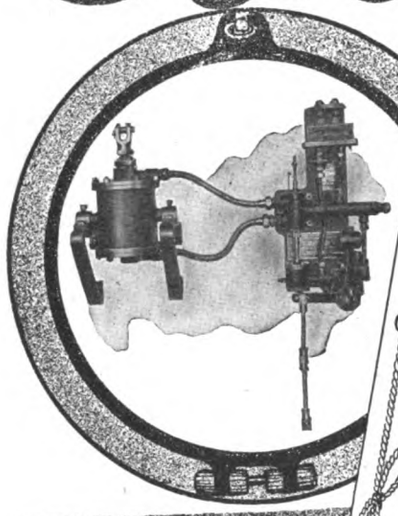
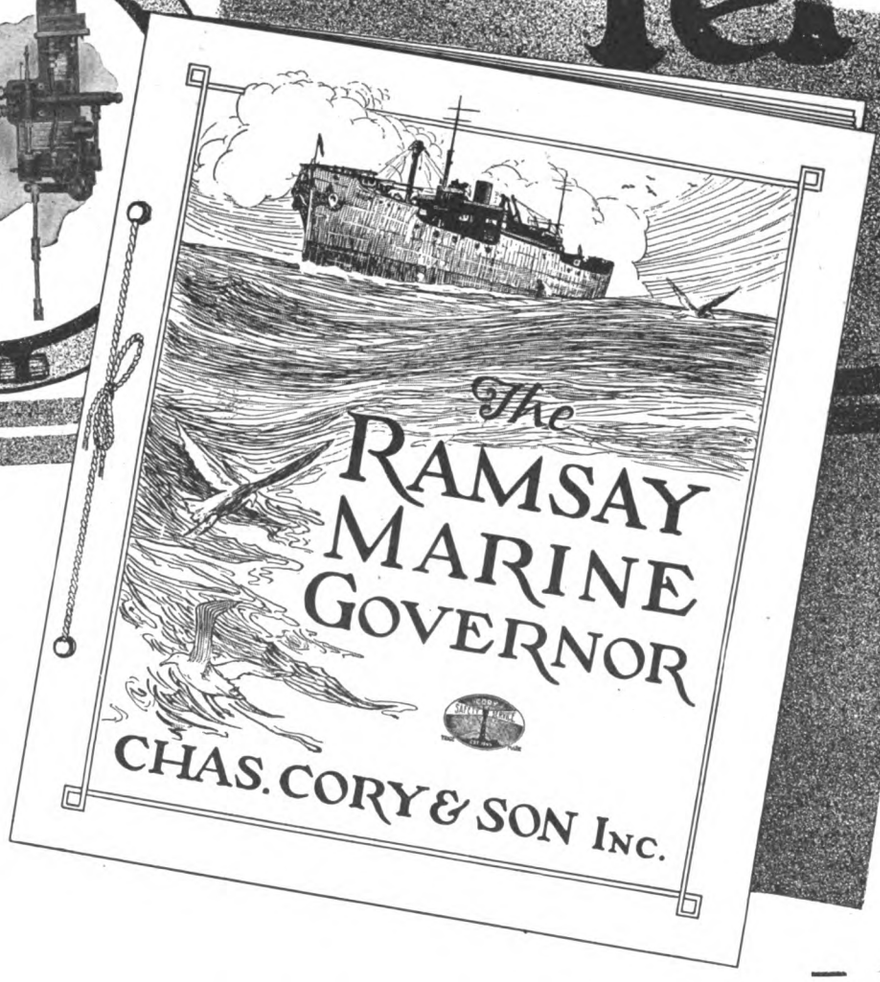
Only a few left





If you have not already received a copy of the "Ramsay Catalog" write for one to-day as we have only a few left.

We shall be glad to meet you at the Second National Marine Exposition, Grand Central Palace, New York—during the week of January 24th, 1921.

Our exhibit will be in Booths 34 to 41.

CHAS. CORY & SON INC.

Main Office and Factory
183-187 VARICK STREET, NEW YORK

Philadelphia
207 Market Street

Seattle
515 Hoge Building

San Francisco
11 Mission Street

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UNITED STATES ARMY TRANSPORTS FOR SALE

WAR DEPARTMENT SURPLUS PROPERTY

Back to The Lanes of Commerce

IT will stir the imagination of the shipping world to learn that the United States Army is about to turn back to the commerce of the world those fine old veterans of two wars, the transports Warren, Crook and Kilpatrick with five others at a later date.

Carrying the halo of a glorious past, they stand ready to shoulder the burden of the congested freight of the world.

The War Department has decided to place these vessels before the shipping world with no hampering restrictions regarding trade routes or freight rates, and with the understanding that at the option of the purchaser either American or British registry may be obtained.

Points of compelling interest are briefly covered on the following pages.

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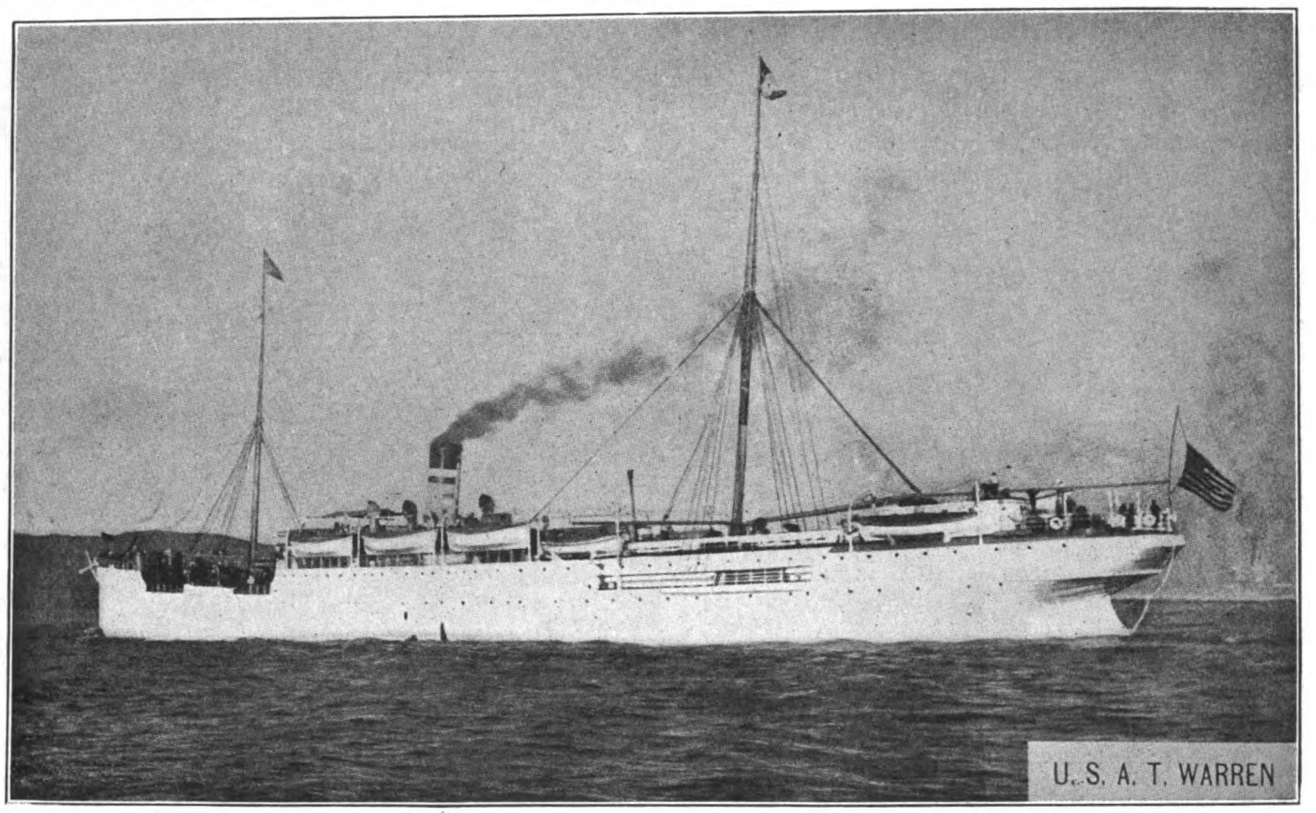

U. S. Army Transport
"WARREN"

4234 Gross Tons.

Equipped and ready to sail.

Steel hull, double bottom, two masted schooner rig, one funnel. Formerly the German S. S. "Scandia" of the Hamburg-American line. Built in 1889. purchased by the War Department in 1898, extensively altered in 1899. Overhauled and repaired in 1901, re-conditioned in 1914. Three decks, three island type of superstructure. Water ballast, 555 tons. Triple expansion engines of 2200 I. H. P. Single bronze bladed screw. Babcock XX and Wilcox water tube boilers, new 1914. Speed, 11 knots. Original rating, Lloyds 100 A-1. Complement, 10 officers, 138 crew. Capacity—Fresh water, 114 tons. Bunkers, 1593 tons. Daily consumption, ordinary, 52 tons; high speed, 56 tons. Steaming radius, 5800 miles. Passengers: first class, 48; troops, 386. Cargo, 2910 tons. No troops or steerage, 3890 tons. Location, Manila Harbor. Will be delivered at U. S. port if desired and so stated in sales contract. Write for booklet giving full details.

THESE ships are particularly well suited for Pacific Coast and Alaskan trade, either as freighters or as combination freight and passenger carriers.

Moderate in size, obtainable at an attractive price, requiring only minor overhauling, and kept in profitable service at a relatively low operating cost, these ships will prove a remunerative investment. They can be used to successful advantage in the South American trade.

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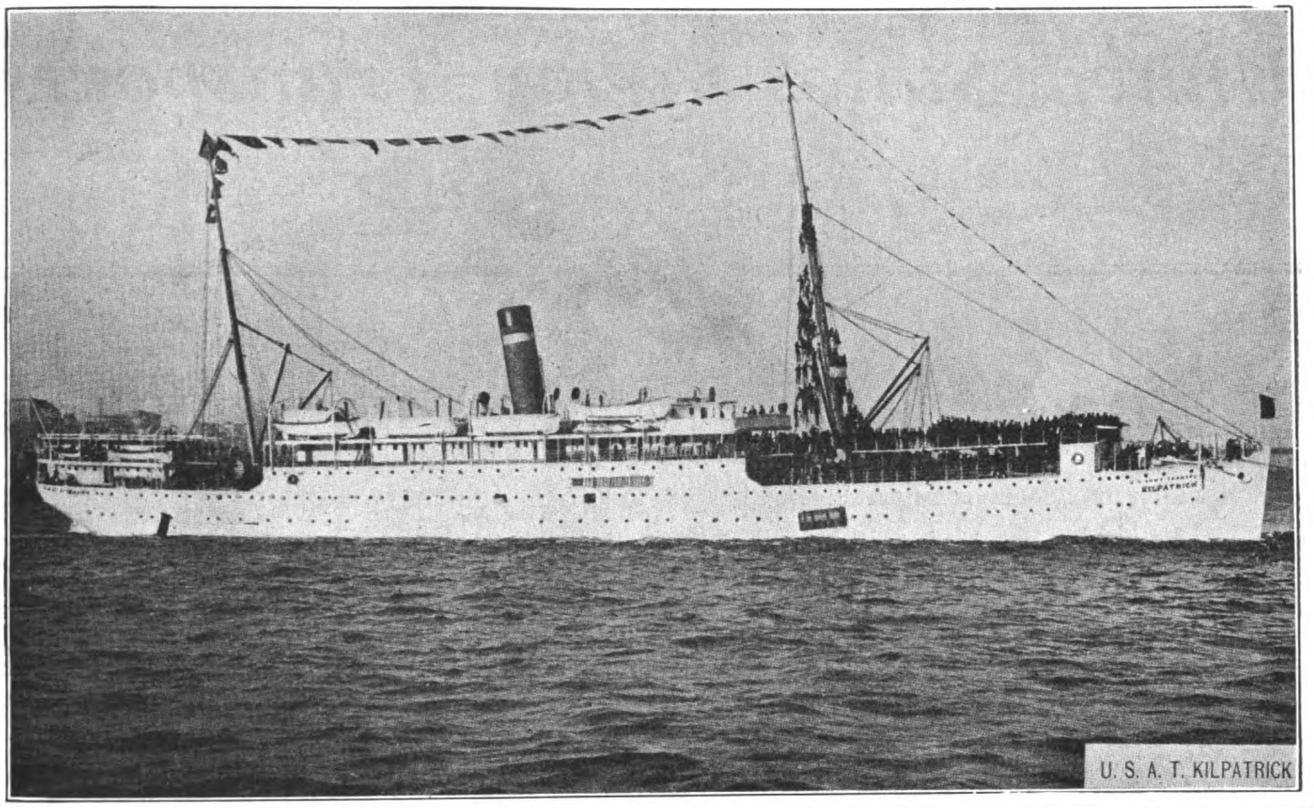

ALL vessels have full marine equipment—except for navigating instruments, which are not included in the sales. They are completely outfitted for passenger service.

Included in the equipment are steward's fittings, napery, silverware, galley equipment, boatswains' stores, general supplies, life boats and launches, life belts and rafts, military standees for the steerage, evaporators and distillers, and many other items.

U. S. Army Transport "KILPATRICK"

Formerly the British S. S. "Michigan," built in 1890 at Belfast, Ireland, by Harlan & Wolf. The "Kilpatrick" is a schooner rigged ship of 5045 gross tons, ready to travel under her own steam; her hull is of steel, and single bottom, and in fair condition throughout. Also is equipped with Scotch Marine boilers and single screw, triple expansion engine of 2300 I. H. P.

U. S. Army Transport "CROOK"

Was built in Scotland by Murry and Company in 1882, and operated as the S. S. Roumania under British registry.

This boat is of schooner rig, steel hull, single bottom construction, and 4,126 gross tons. This vessel is ready to steam under her own power at from 10 to 13 knots an hour. Her cargo capacity is 4,188 tons with 10,800 cubic feet of cold storage.

Was reconditioned in 1915 and fitted with large hatches for service under the Alaska Railway Commission. Well suited for West Coast Trade.

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United States Army Transports for Sale

In addition to the three transports named on the preceding pages, the following, which are in service at present, will be placed on sale at a later date.

"BUFFORD"—Sister ship to Kilpatrick		5040 Gross Tons.
"SHERMAN"	These four are sister ships	5780 " "
"SHERIDAN"		5673 " "
"THOMAS"		5796 " "
"LOGAN"		5672 " "

Asst. Chief, U. S. Army Transport Service

Dept. D, Pier 2, Hoboken, N. J.

The "Warren," "Crook," and "Kilpatrick" may be inspected by interested parties at any time. Bids on these three vessels will be received at the above address up to 10 A. M. EASTERN STANDARD TIME, JANUARY 8, 1921. If you will tear off and mail this coupon, you will receive a booklet giving complete information regarding location of the ships (where they may be visited for inspection), their history, construction, deck plans, etc.

U. S. Army Transport Service,
Dept. D, Pier 2, Hoboken, N. J.

Please send booklet on transports to

Firm Name.....

Street Address.....

City.....State.....

Signed by.....

Note: This booklet, of course, will be mailed to responsible parties only.

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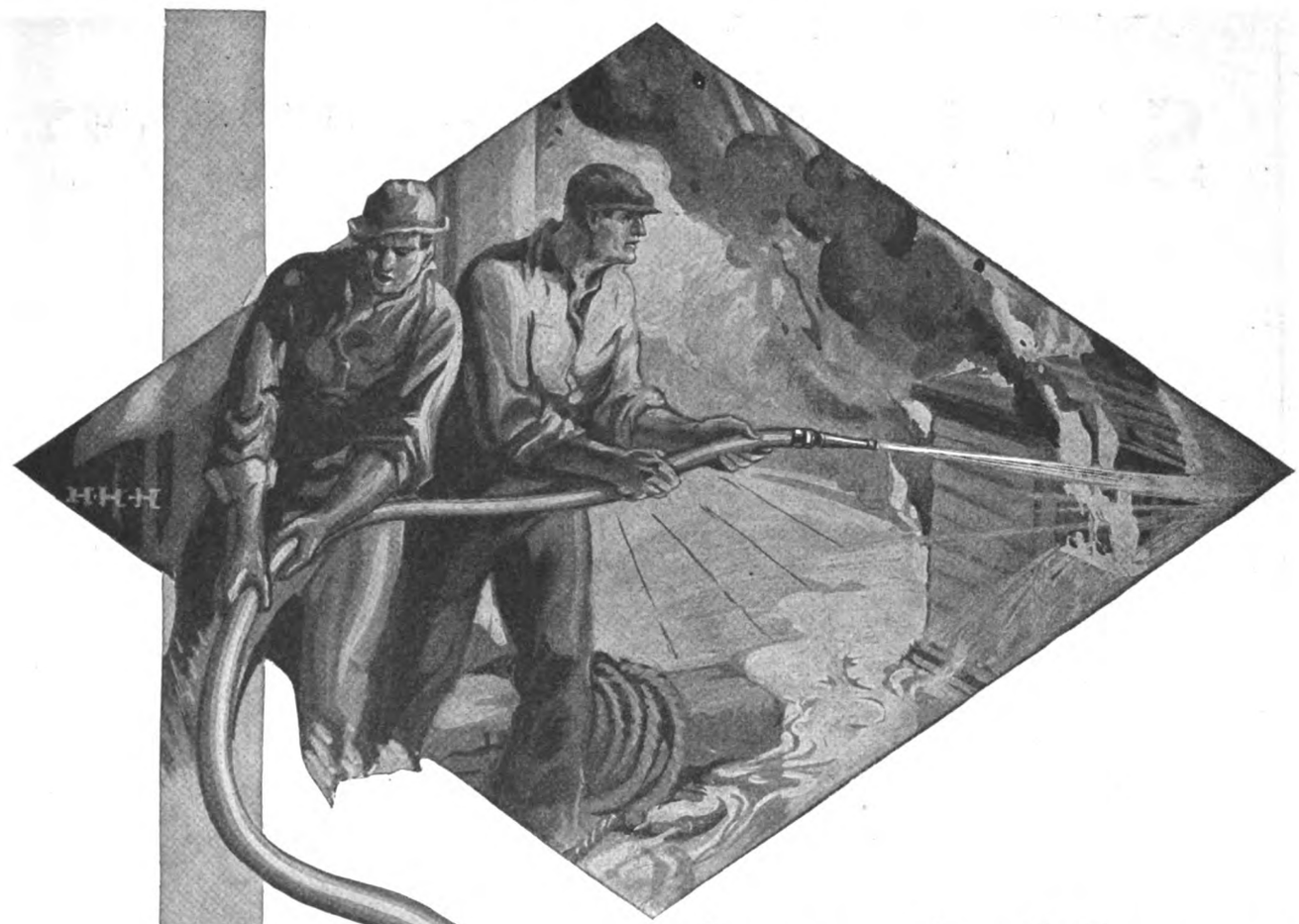

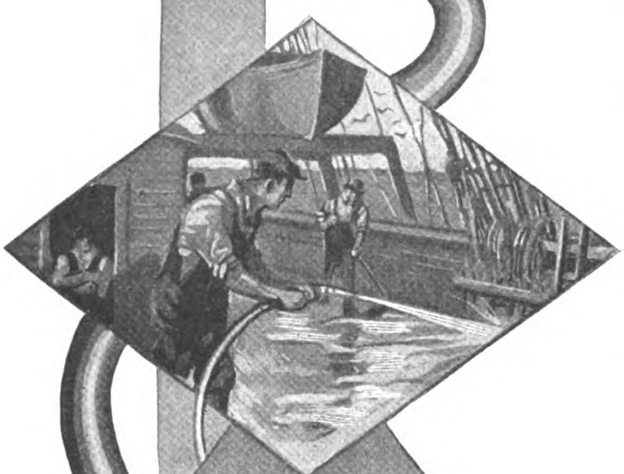

IT'S A Diamond PRODUCT

Chases the Menace and Chases the Dirt

THAT'S the job of any marine hose, but particularly one for Diamond. When the heat of the Tropics saps the energy of another hose, or the cold of the Arctics cracks it, you will find Diamond Hose full of life and rubber energy—ever ready for the task whatever it might be. No other hose is so surely dependable—no other lasts so long. Thus, it's more reliable and more economical.

There's a Diamond Distributor in every large port. See him for your rubber needs.

Rubber Matting, Packing, Gaskets, Hose, Valves—everything in rubber for marine purposes.

THE DIAMOND RUBBER CO.
Incorporated
Akron, Ohio

Diamond MARINE HOSE

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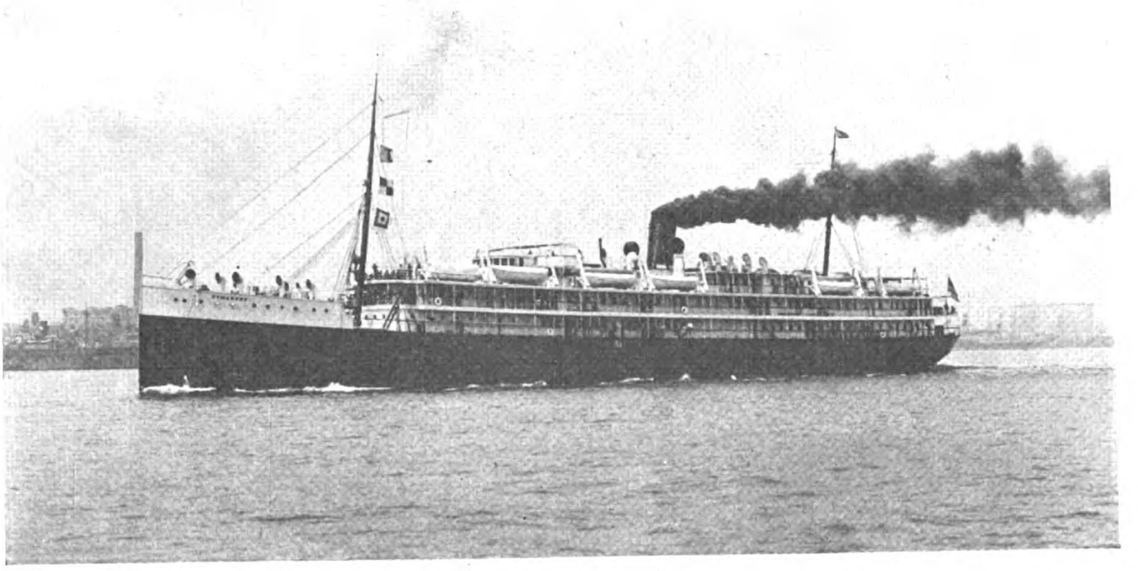
S. S. COMANCHE



Equipped with

BRUNSWICK
Ice Machines
for Refrigeration

BRUNSWICK REFRIGERATING CO.

Marine Department

750-800 Jersey Avenue New Brunswick, N. J.

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New Jersey Zinc

The world's standard for Zinc products

Cooperative Chemical Research

The war gave applied chemical research the greatest impetus that science has ever known. In keeping with its progressive program the New Jersey Zinc Company has recently built the most extensive, most completely manned and best equipped research laboratory in the field of zinc.

Through this institution we cooperate with clients in the marine engineering field in both research and test work, to develop the highest quality of zinc products and determine their most economic application in various industries.

Bring your technical problems to us.

THE NEW JERSEY ZINC COMPANY, *160 Front Street*, New York
ESTABLISHED 1848]

CHICAGO: Mineral Point Zinc Company, 1111 Marquette Building

PITTSBURGH: The New Jersey Zinc Co. (of Pa.), 1439 Oliver Building

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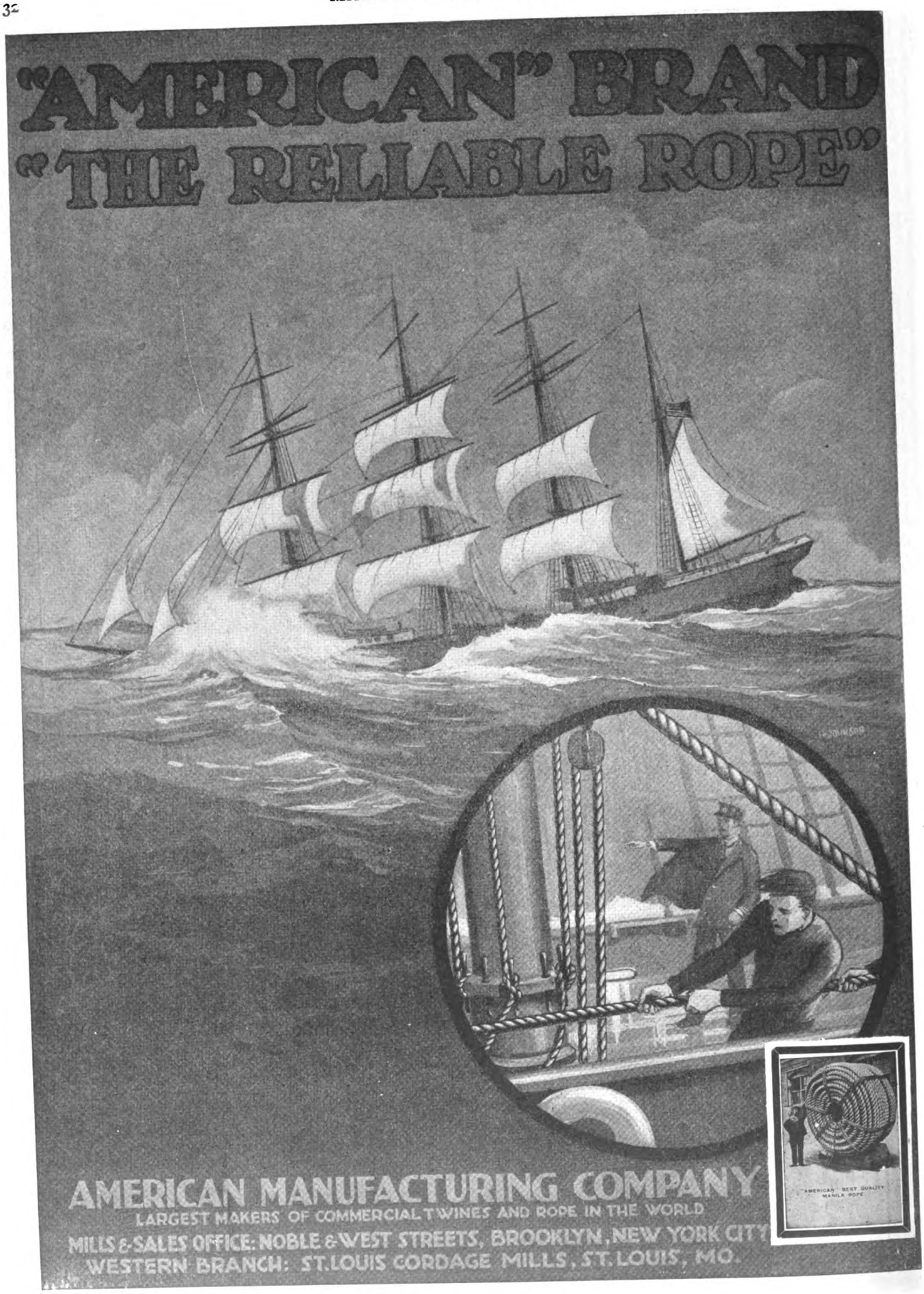
"AMERICAN" BRAND
"THE RELIABLE ROPE"
AMERICAN MANUFACTURING COMPANY
LARGEST MAKERS OF COMMERCIAL TWINES AND ROPE IN THE WORLD
MILLS & SALES OFFICE: NOBLE & WEST STREETS, BROOKLYN, NEW YORK CITY
WESTERN BRANCH: ST. LOUIS CORDAGE MILLS, ST. LOUIS, MO.

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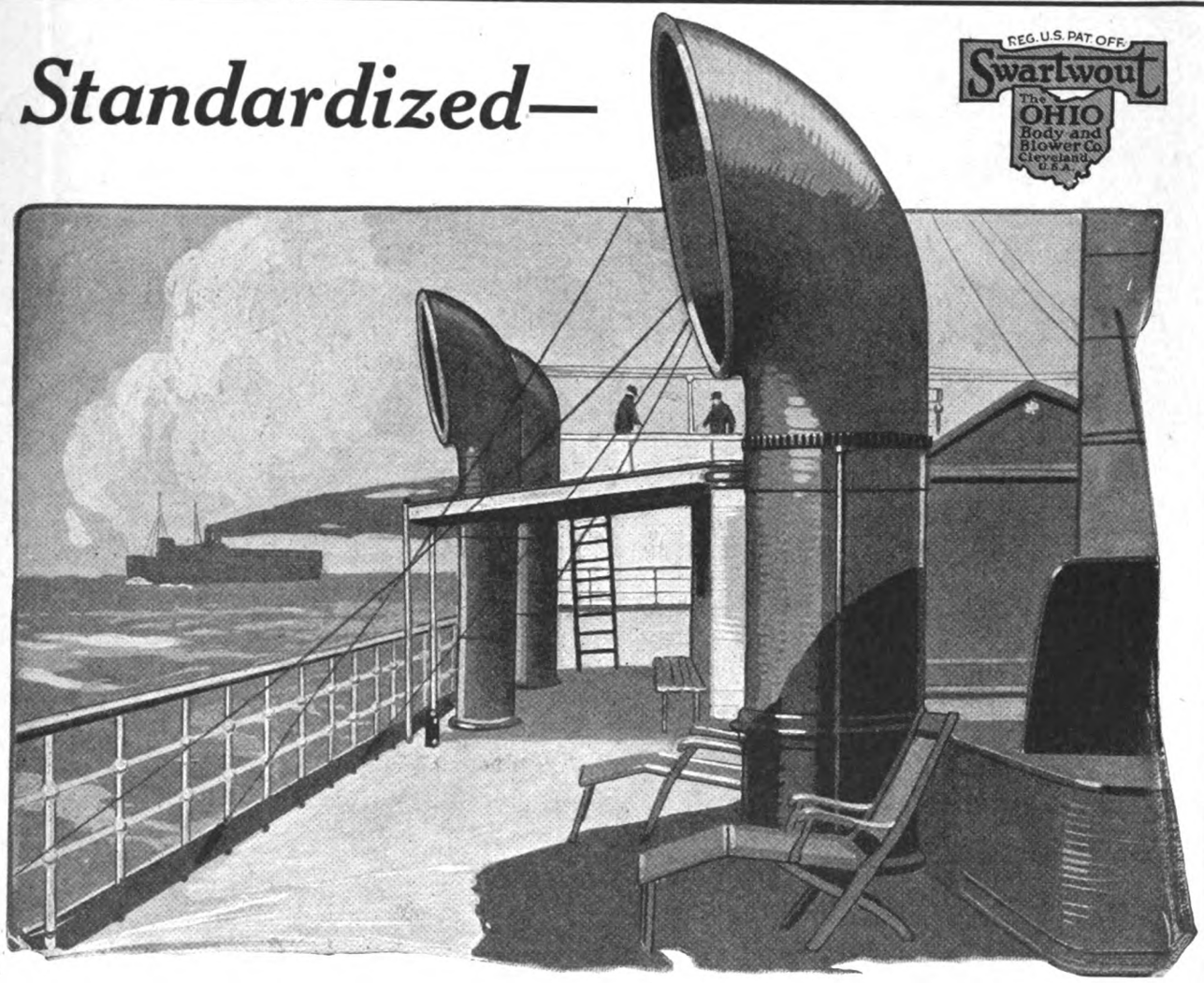
Standardized—

REG. U.S. PAT. OFF.
Swartwout
The OHIO Body and Blower Co. Cleveland, U.S.A.



WITH the Swartwout Standardized Cowl the builder can specify a cowl complete with coaming and turning gear merely by name and size, being assured in return the highest grade design and sheet metal craftsmanship.

Printed matter covering the details of construction will be mailed on request. Send for it.

Marine Department

The Ohio Body & Blower Company

CLEVELAND, OHIO

Swartwout

STANDARDIZED SHIP COWLS

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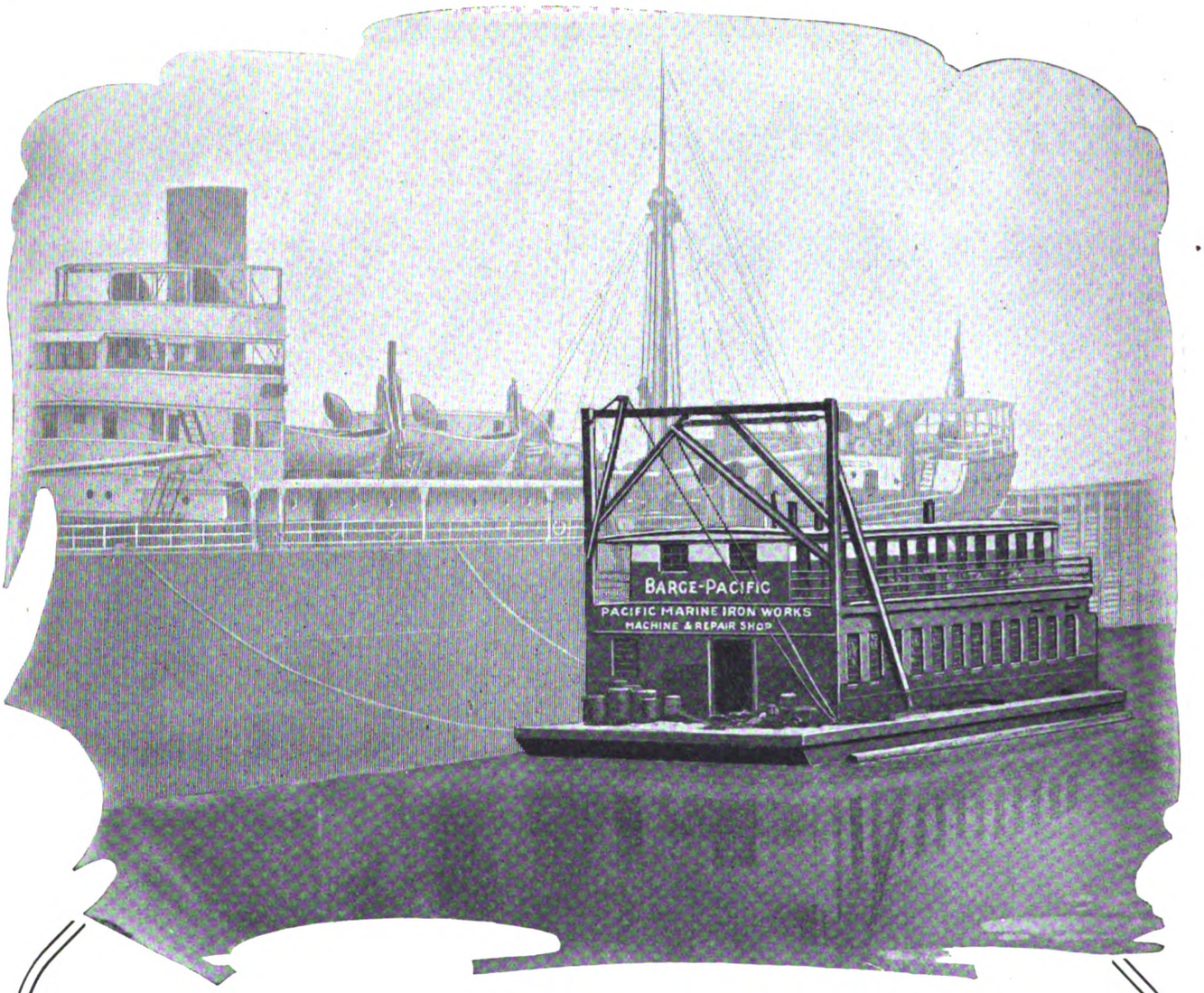

Bring The Shop To The Ship
No Interference With Cargo Handling

YOUR hull or engine repairs while in the Columbia River need take no time from discharging or loading cargo. Our floating repair shop is equipped with a fully outfitted machine shop for repairs to engines or hull—air tools—boiler repair equipment and a complete blacksmith shop with oxyacetylene and electric welding and cutting equipment.

There is no repair too small for our prompt attention and none too big for our equipment and experience. Phone, wire or write and you will receive prompt attention.

WE HAVE MADE MANY RECORDS FOR SPEED AND ECONOMY—LET US HELP YOU

Manufacturers of BALLIN WATER TUBE BOILERS

Pacific Marine Iron Works

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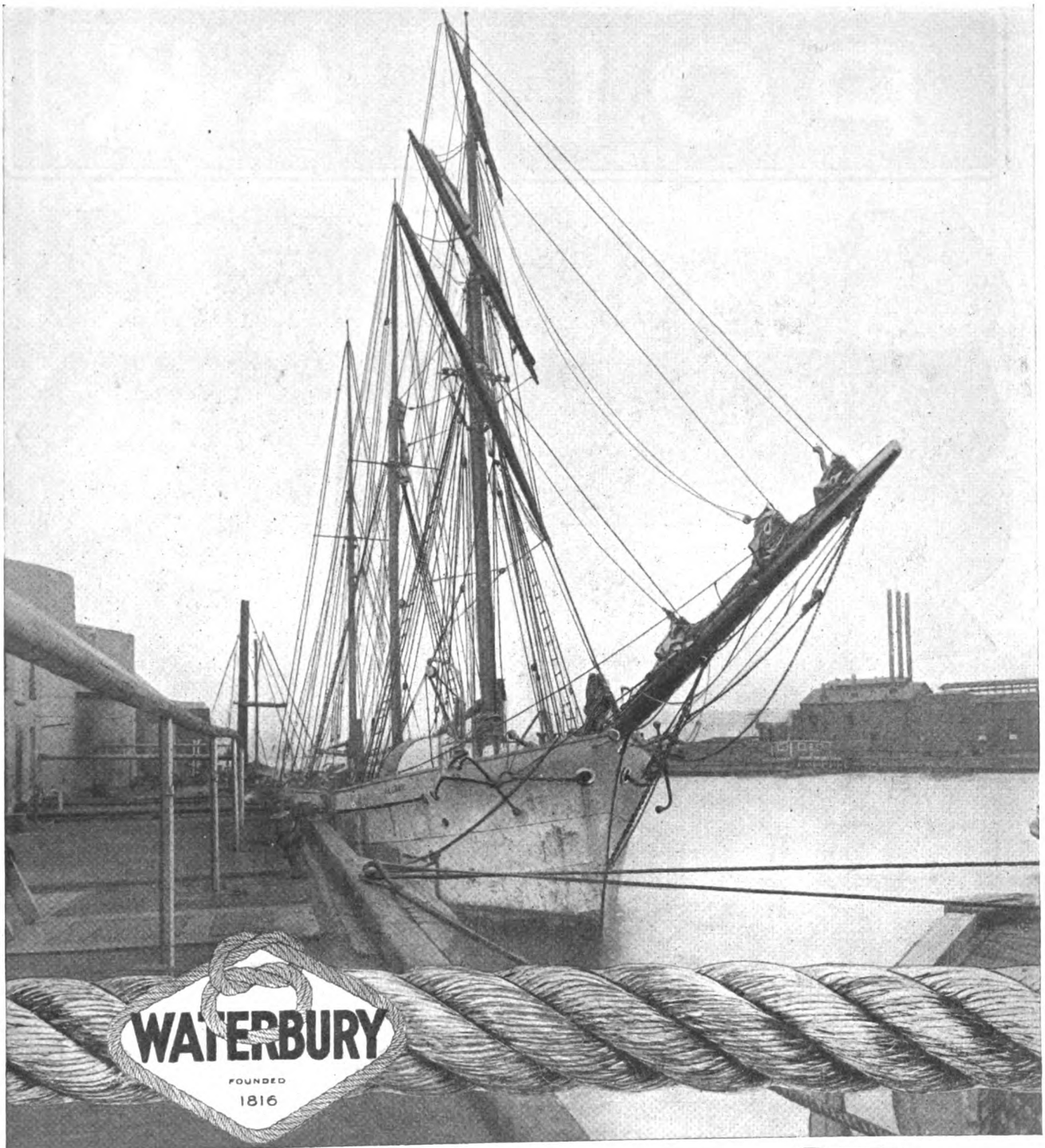

If it's cordage, the Waterbury brand is all you have to look for. The Waterbury Company has made that brand mean standard quality for more than a hundred years on every sort of cordage, from twine to 15-inch hawsers.

WATERBURY COMPANY

63 PARK ROW, NEW YORK

Makers of Wire, Armored, Fibre and Fibreclad Rope, also Music Wire

CHICAGO	609-613 North La Salle St.
SAN FRANCISCO	151-161 Main St.
NEW ORLEANS	1018 Maison Blanche Bldg.
DALLAS, TEXAS	A. T. Powell & Co.

160,000 rope buyers use the Waterbury GREEN BOOK as a guide. A copy will be sent free on request.

2413-V

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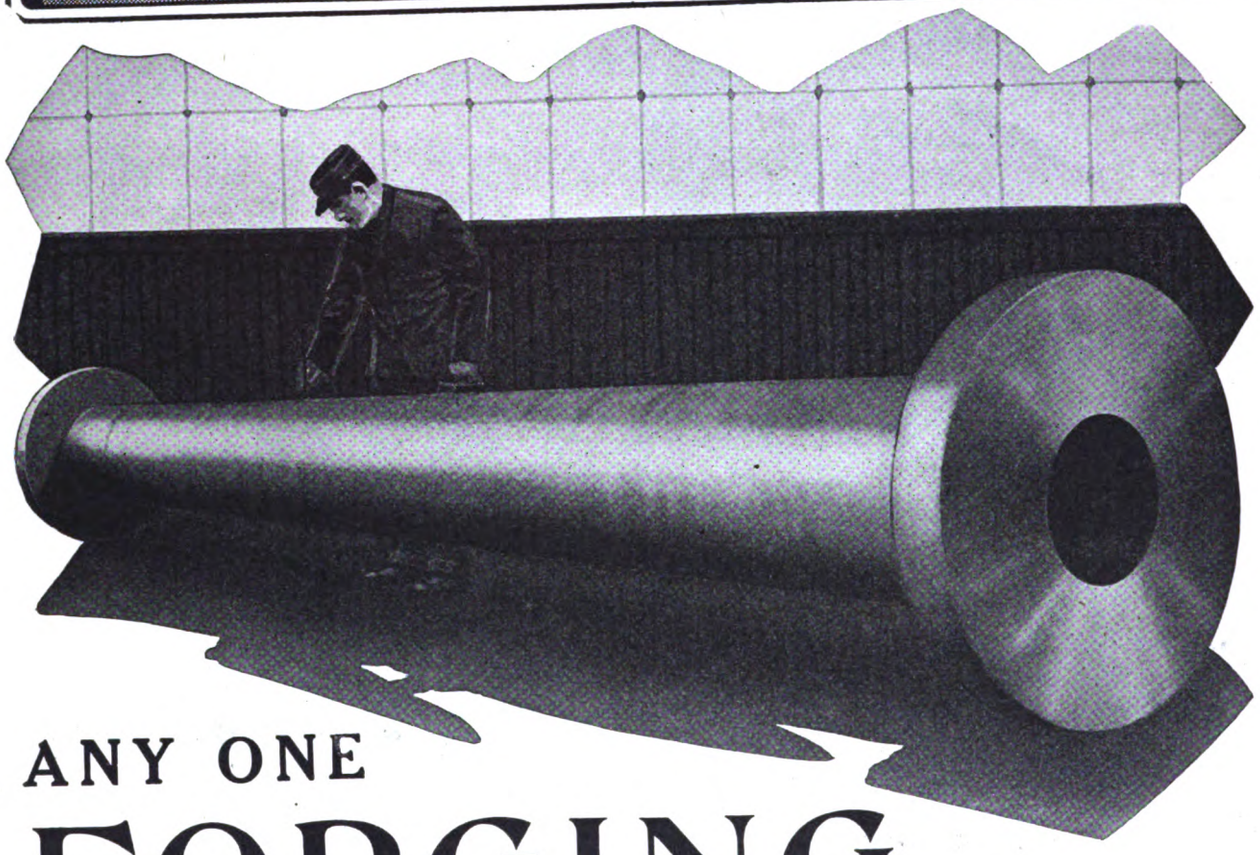
POLLAK



ANY ONE

FORGING

from Pollak is as good as any other Pollak forging—we make them all alike.

Consistently Uniform Forgings

and

Deliveries to meet requirements

have placed Pollak on the preferred list of the largest users of Forgings. We forge, machine, hollow bore, heat treat from plain open hearth or alloy steel.

Also manufacturing Drop Forgings and Rolled Steel Bars and Shapes. Concrete Reinforcing Bars.

THE POLLAK STEEL COMPANY

General Office,
381 W. 71st Street,
Cincinnati, Ohio, U. S. A.

General Sales and Foreign Offices,
2816 Equitable Building, New York City.
Cable Address "Poscosteel," New York

Works, Cincinnati,
Marion, Ohio, Chicago.

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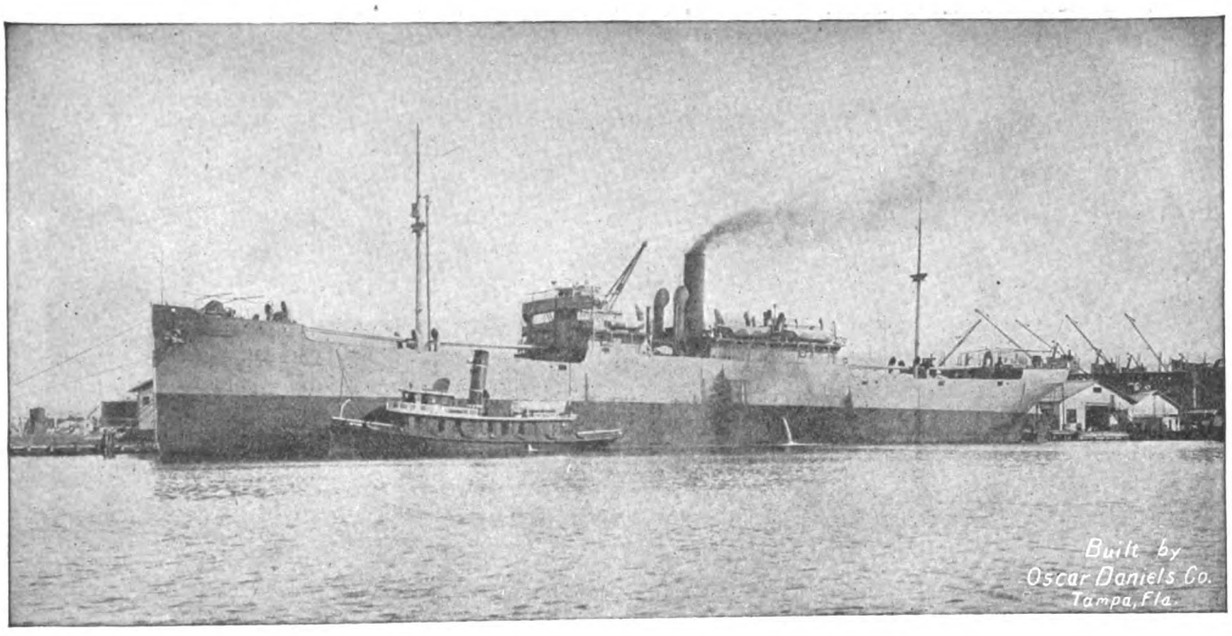
Oscar Daniels Company

We have Five Building Ways Suitable for Ships up to 15,000 tons D. W.



Are now completing orders for ten 9,500 ton ships of above design.

We specialize on general Freighters, Colliers and Tank Ships.

Oscar Daniels Company

Shipyard—Tampa, Fla.

GENERAL OFFICE
Woolworth Building, New York City

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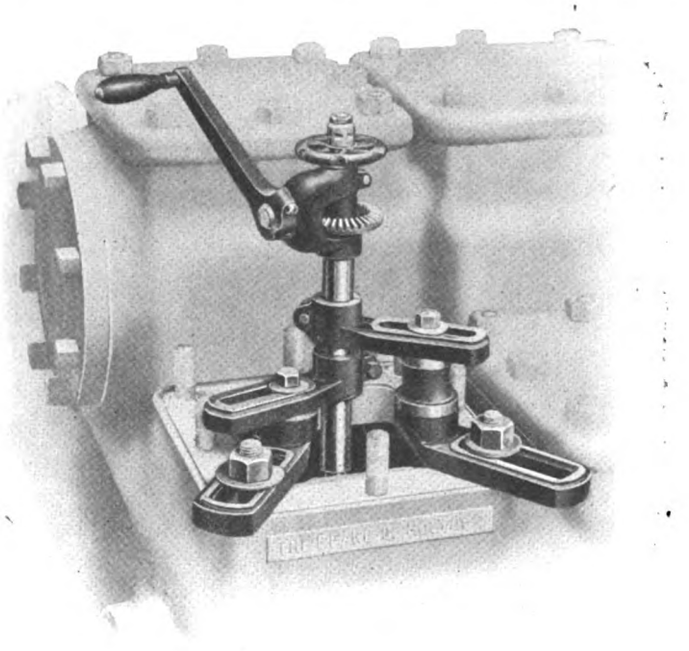
REDUCING FUEL COSTS

Fuel prices have risen, are rising, and are likely to rise still further in the future, for costs of mining, of hauling and handling are increasing steadily, and our most easily mined sources are being rapidly depleted.

It is up to the engineer who is responsible for the manufacture and utilizing of power to keep down the fuel cost by reducing waste of power.

A sure way to stop a big power waste is to reface your pump valve seats with a

DEXTER PUMP VALVE RESEATING MACHINE



It is a well-known fact that the pump is the most wasteful of power plant units. This machine will reduce the slippage from 25 to 50% down to 1.8%, thus greatly reducing the fuel cost of pumping.

Can you afford to be without one?

Write now for Catalog M-22.

THE LEAVITT MACHINE COMPANY

ORANGE, MASS., U. S. A.

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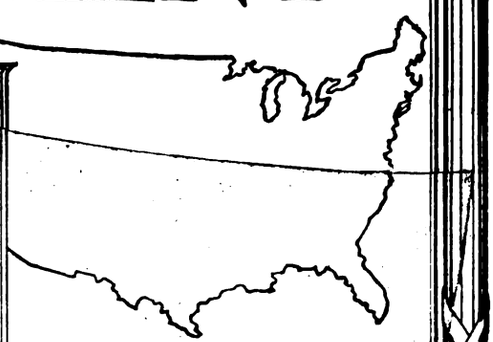
AN AMERICAN ACHIEVEMENT



WHEN the emergency was greatest and tracing cloth was more than ever needed urgently, it was then that this only American-made tracing cloth transferred the standard of excellence to the native product.

It was proven on the drafting boards of America's largest industries to be a product of quality unsurpassed by any other Now that imported cloth may be readily secured, have these concerns changed back to it? Our sales sheets say no!

National Tracing Cloth provides a uniform drafting surface that will endure continual wear and tear of handling, that can be scraped and rubbed, yet gives good prints, one that has a smooth, even texture and a wonderful transparency. It is backed by the guarantee that any sheet or roll which is not free from blemish will be replaced free of expense to you.

If you have been seeking an *ideal* drafting medium —here it is, A sample sheet will immediately be sent to you. Test it thoroughly. Send for it today.

A Product of the

NATIONAL TRACING CLOTH CO.

SAYLESVILLE, RHODE ISLAND

National Tracing Paper National Blueprint Cloth

National White Pencil Cloth

National TRACING CLOTH

107-2

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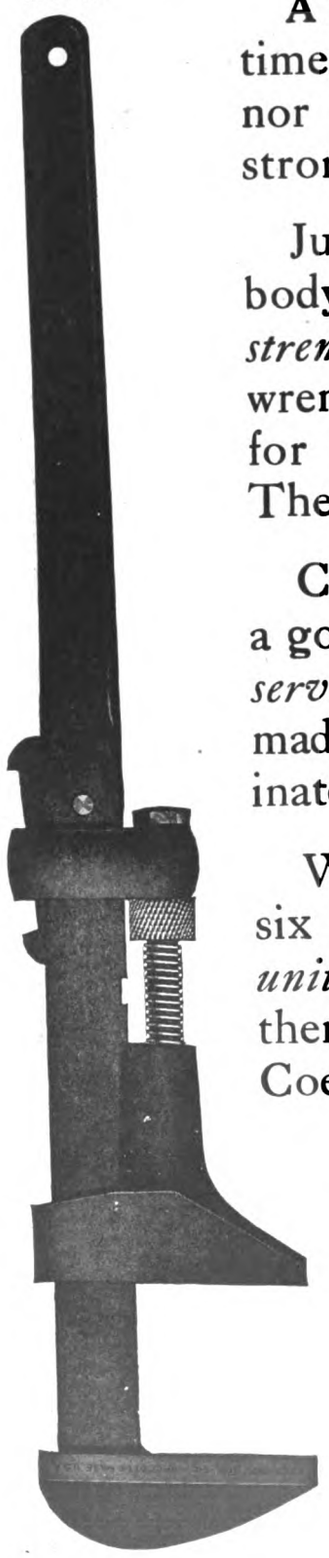
The Importance Of a Strong Constitution

3 Sizes
28"-36"
and 48"

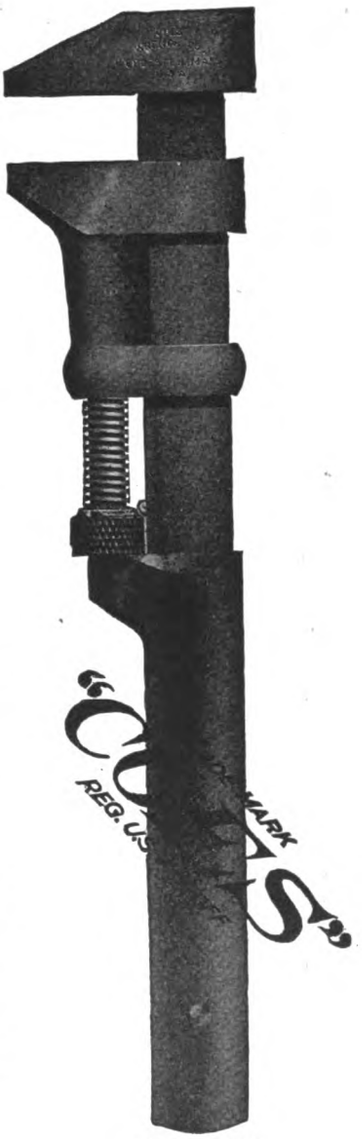


A man who is sick most of the time cannot accomplish much—nor a wrench, *both* must have a strong constitution.

Just as each part of the human body must contribute its share of *strength*, so must each part of a wrench *unite* with the other parts for this same accomplishment. There must be no *weak parts*.

Coes "Steel-Handle" Wrench is a good example of how *strong* and *serviceable* a screw wrench can be made when *useless* parts are eliminated.

With a constitution made up of six solid, simple whole parts, all *united* by the strong Coes method, there isn't a sign of weakness in a Coes Steel Wrench anywhere.



COES
"Steel-Handle"
WRENCH

7 Sizes
6" to 21"

These two models are especially made for trying service, in moisture, (hot or cold) and for heavy duty.

Coes Wrench Company

Established 1841 in
Worcester, Mass.

J. C. McCARTY & CO., 29 Murray Street, New York
J. H. GRAHAM & CO., 113 Chambers Street, New York
FENWICK FRERES, 8 Rue de Rocroy, Paris, France
For Continental Europe

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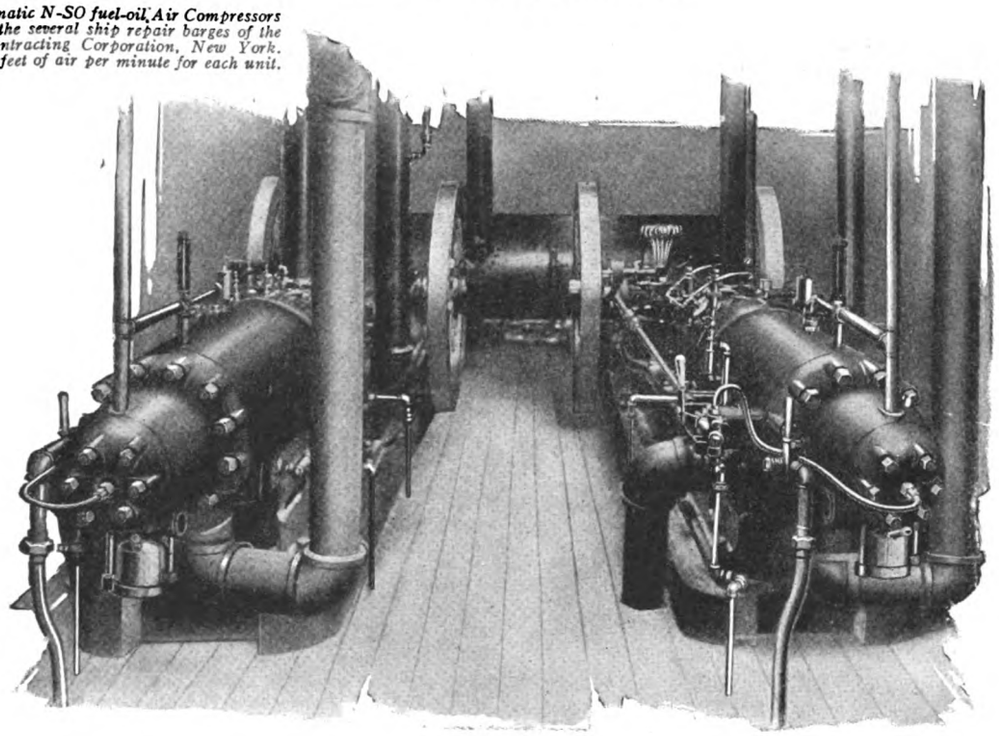
Two Chicago Pneumatic N-SO fuel-oil Air Compressors installed on one of the several ship repair barges of the United Marine Contracting Corporation, New York. Capacity 809 cubic feet of air per minute for each unit.



Space-saving air power units

HERE'S a Chicago Pneumatic Oil-Driven Air Compressor outfit *complete in one unit*—ideal for use wherever space is a big factor.

Power cylinder and air cylinder combined in one unit require small floor space—a distinct advantage over the ordinary compressor belted to a separate engine.

These compact, dependable units embody the same distinctive features of construction as all Chicago Pneumatics, namely:

Simplate flat-disc indestructible valves, exceptionally large bearing surfaces, totally enclosed frame construction, self-oiling throughout, and automatic regulation insuring ideal operating economy under variable loads.

Chicago Pneumatic Air Compressors are built in over 300 sizes and types—all modern. Ask for Bulletins.

Chicago Pneumatic Tool Company

Chicago Pneumatic Building · 6 East 44th Street · New York

Sales and Service Branches all over the World

•Birmingham •Boston •Buffalo •Chicago •Cincinnati •Cleveland •Detroit •El Paso •Erie •Franklin •Houston •Joplin •Los Angeles •Minneapolis •New Orleans •New York •Philadelphia •Pittsburgh •Portland Richmond Salt Lake City •San Francisco •Seattle •St. Louis Barcelona •Berlin Bombay Brussels Buenos Aires Cadiz Christiania •Fraserburgh Havana Honolulu Johannesburg Lisbon •London Madrid Milan •Montreal Osaka •Paris •Seoul Tokyo Toronto Vancouver Winnipeg

C-78

BOYER PNEUMATIC HAMMERS · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · VACUUM PUMPS · PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES · ROCK DRILLS · COAL DRILLS

CHICAGO PNEUMATIC

The Compressor with the Simplate Valve

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"This Proves It's Columbian"

"There's NOW no risk in buying rope. All I have to do is to make sure that I get the rope with this Red, White and Blue *Tape-Marker* in it which proves that it's genuine *Tape-Marked* Columbian Pure Manila Rope. This *Tape-Marker* is imbedded in one strand for the entire length of the rope and is an absolute guarantee that the Columbian Rope Company stands behind its *Tape-Marked* Rope as regards Durability, Strength, Quality of fibre and Workmanship."

"Tie up to this *Tape-Marked* rope, Lads, and you'll never be adrift in your cordage buying."

COLUMBIAN ROPE CO., 372-90 Genesee St.
Auburn, N. Y., "The Cordage City"
Please send, without charge, 1 copy of new Columbian Catalog and sample of your tape marked rope.
Name

BY INVITATION MEMBER OF

NEW YORK U.S.A.

COLUMBIAN ROPE COMPANY

AUBURN, N. Y. "*The Cordage City*"

Branches:— New York Chicago Boston
Baltimore Houston

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Are Your Interests
Protected by the
Shield of Quality
drills, reamers, milling cutters, countersinks, chucks, taps, etc. High speed or Carbon Steel, as your work requires, but with the same virtue, Dependability.
The Standard Tool Co.
Cleveland, Ohio, U. S. A.
STANDARD

New York Store, 94 Reade St.
Chicago Store, 552 W. Washington Blvd.
Boston Store, 1101 Scollay Bldg.
Philadelphia Store, 401 Liberty Bldg.
Great Britain, Burton Griffiths & Co., Ltd., London
France, Burton Fils, Paris
Switzerland, J. Lambercier & Cie, Geneva
Denmark, Nienstaed & Co., Cpenhagen
Portugal, American Machinery Syndicate of Spain, Lisbon
Japan, Horne Co., Ltd.. Tokyo

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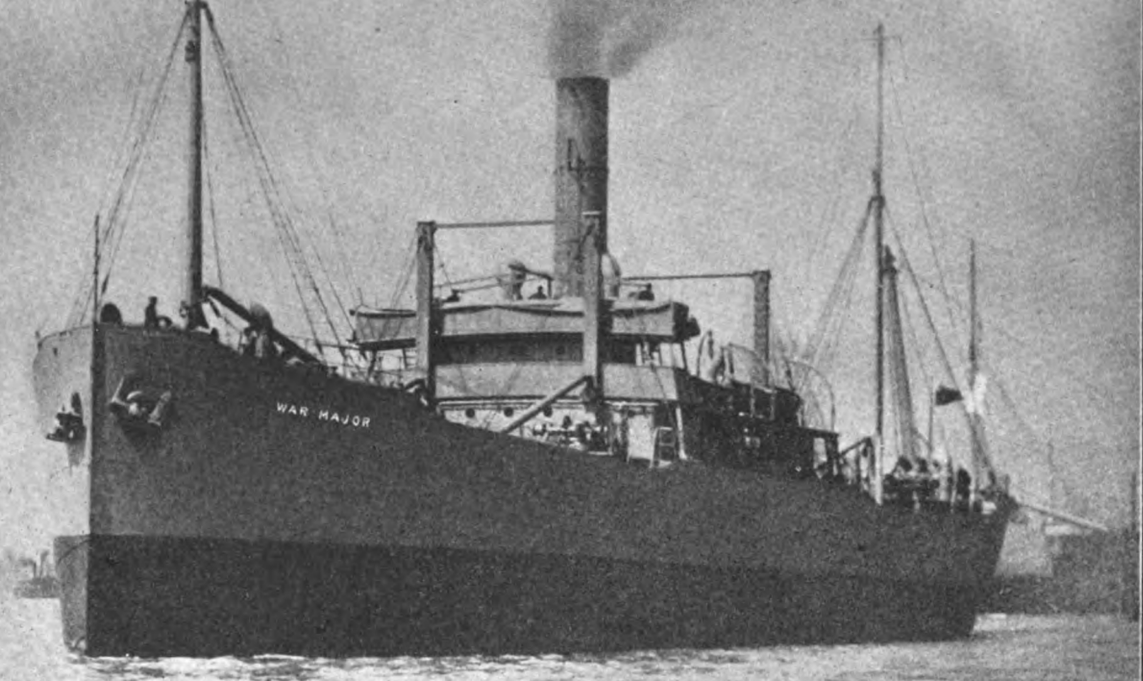
THE

AMERICAN SHIP BUILDING CO.,

CLEVELAND, OHIO



SHIP BUILDERS ENGINEERS

DRY DOCKING REPAIRS

SHIPS BUILT TO THE HIGHEST CLASS OF BRITISH LLOYDS AND THE AMERICAN BUREAU OF SHIPPING FOR DEEP SEA SERVICE . . . . .

—PLANTS AT—

CLEVELAND, OHIO DETROIT, MICH. BUFFALO, N. Y. WYANDOTTE, MICH.
LORAIN, OHIO MILWAUKEE, WIS.
SUPERIOR, WIS. CHICAGO, ILL.

COMBINED CAPACITY OVER 500,000 D. W. TONS YEARLY

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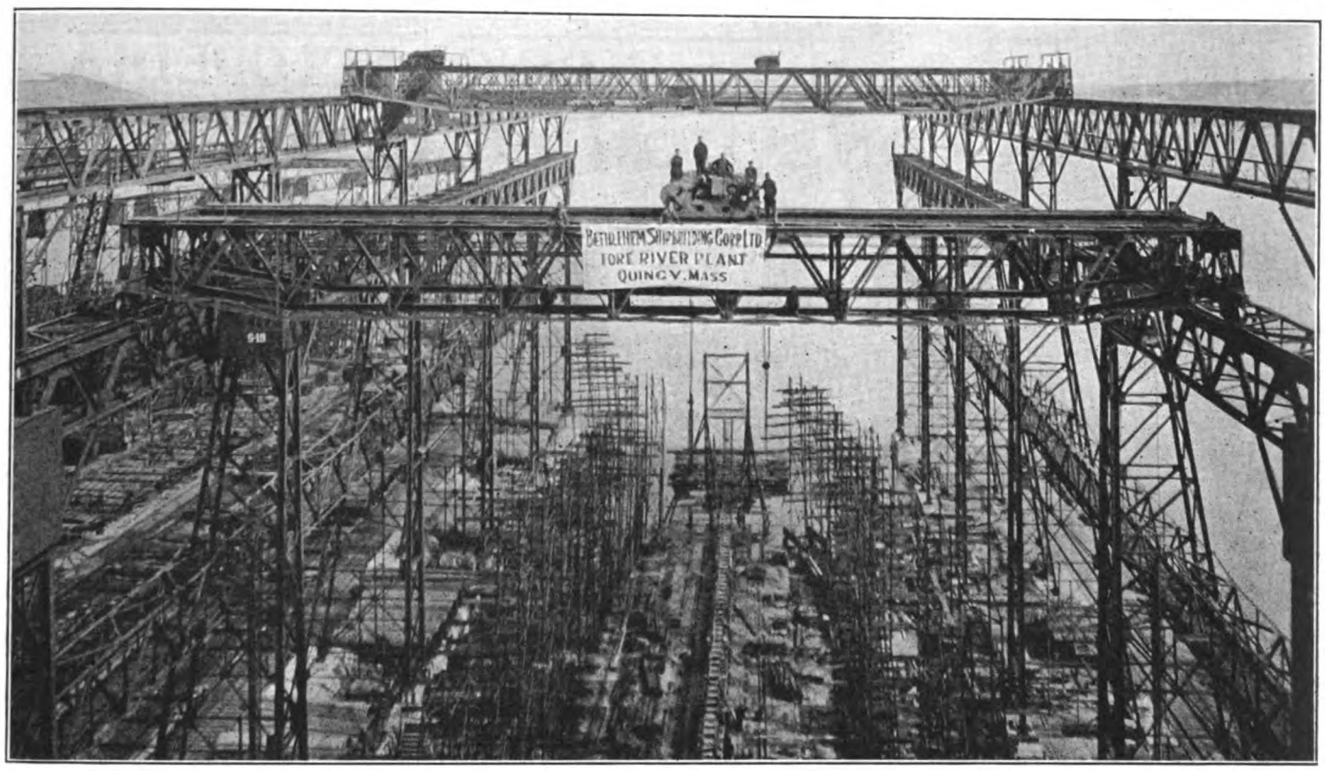

One 50-ton Mill-H 4-Motor Crane 131'-6" Span and one 7½-ton Mill-H 3-Motor 136'-6" Span Crane. Bethlehem Shipbuilding Corp., Ltd., Fore River Plant, Quincy, Mass.

Speed Accuracy Dependability

THE three qualifications necessary in an Electric Travelling Crane for Ship Construction. Because P. & H. Electric Cranes possess these requirements they were selected by the leading Navy Yards and Shipbuilding Plants on both the Atlantic and Pacific Coasts. *The result of 35 years' experience in the manufacture of Electric Travelling Cranes and Electric Hoists.*

PAWLING & HARNISCHFEGER CO.
EST. 1884
MILWAUKEE, WISCONSIN

50 Church St., New York
704 Stephen Girard Bldg., Phila.
47 Fidelity Bldg., Pittsburgh
821 Monadnock Bldg., San Francisco
Central Bldg., Los Angeles, Cal.
L. C. Smith Bldg., Seattle, Wash
Yeon Bldg., Portland, Ore.
1241 Monadnock Bldg., Chicago
926 Whitney Central Bldg., New Orleans

P&H cranes-hoists-monorail systems

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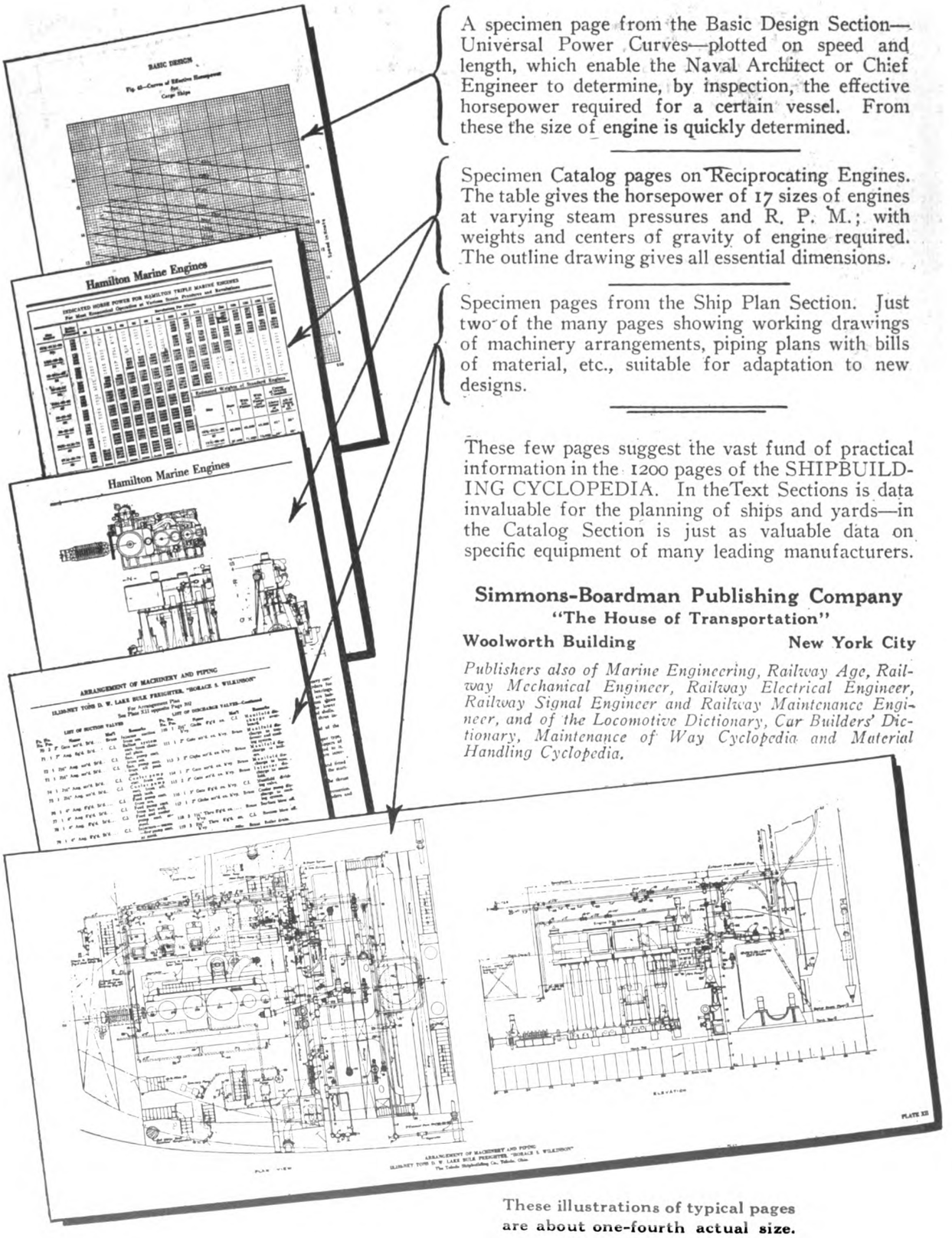
How The SHIPBUILDING CYCLOPEDIA Speeds up Design



A specimen page from the Basic Design Section—Universal Power Curves—plotted on speed and length, which enable the Naval Architect or Chief Engineer to determine, by inspection, the effective horsepower required for a certain vessel. From these the size of engine is quickly determined.

Specimen Catalog pages on Reciprocating Engines. The table gives the horsepower of 17 sizes of engines at varying steam pressures and R. P. M.; with weights and centers of gravity of engine required. The outline drawing gives all essential dimensions.

Specimen pages from the Ship Plan Section. Just two of the many pages showing working drawings of machinery arrangements, piping plans with bills of material, etc., suitable for adaptation to new designs.

These few pages suggest the vast fund of practical information in the 1200 pages of the SHIPBUILDING CYCLOPEDIA. In the Text Sections is data invaluable for the planning of ships and yards—in the Catalog Section is just as valuable data on specific equipment of many leading manufacturers.

Simmons-Boardman Publishing Company
"The House of Transportation"
Woolworth Building **New York City**

Publishers also of Marine Engineering, Railway Age, Railway Mechanical Engineer, Railway Electrical Engineer, Railway Signal Engineer and Railway Maintenance Engineer, and of the Locomotive Dictionary, Car Builders' Dictionary, Maintenance of Way Cyclopedia and Material Handling Cyclopedia.

These illustrations of typical pages are about one-fourth actual size.

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The Braided Jacket adds enormous STRENGTH

And that is but one of the many points of superiority in Indestructible Pneumatic Tool Hose. Note the thickness of the rubber cover—it gives ample protection against external injury without the necessity for wire or other armoring.

Here is construction you can see is good. The rubber stocks used throughout are the best—the tube is compounded to resist the effects of oil—the friction strength is unusual and the rubber cover tough and elastic.

These features make Indestructible Tool Hose long lived and dependable. It is flexible and free from kinking.

NEW YORK BELTING & PACKING CO.

New York
Boston
Pittsburgh
Chicago
St. Louis
Philadelphia
San Francisco
Salt Lake City

NEW YORK BELTING & PACKING CO. FOUNDED 1846 INCORPORATED 1856

Rubber Goods for Shipyards and Ships

Test Special Rubber Belting
Acetylene Welding Hose
Indestructible Steam Hose
Firo Sheet Packing
Indestructible Sheet Packing
Cobbs Piston Packing
Water Hose Fire Hose
Pump Valves

INDESTRUCTIBLE PNEUMATIC TOOL HOSE

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THE AMERICAN MARINE EXPOSITION

MARCH 14 to 19 inc. 1921

First Regiment Armory

Philadelphia

Will your product be displayed in this World's nautical trade mart?

Space is rapidly being taken by the big ship yards and many other representative firms.

Write or wire for prospectus, list of exhibitors, floor plans, rates, etc.

The American Exposition Co.

Real Estate Trust Building
PHILADELPHIA

Every Afternoon—"Buyers' Afternoon"

Every Night—"Buyers' Night"

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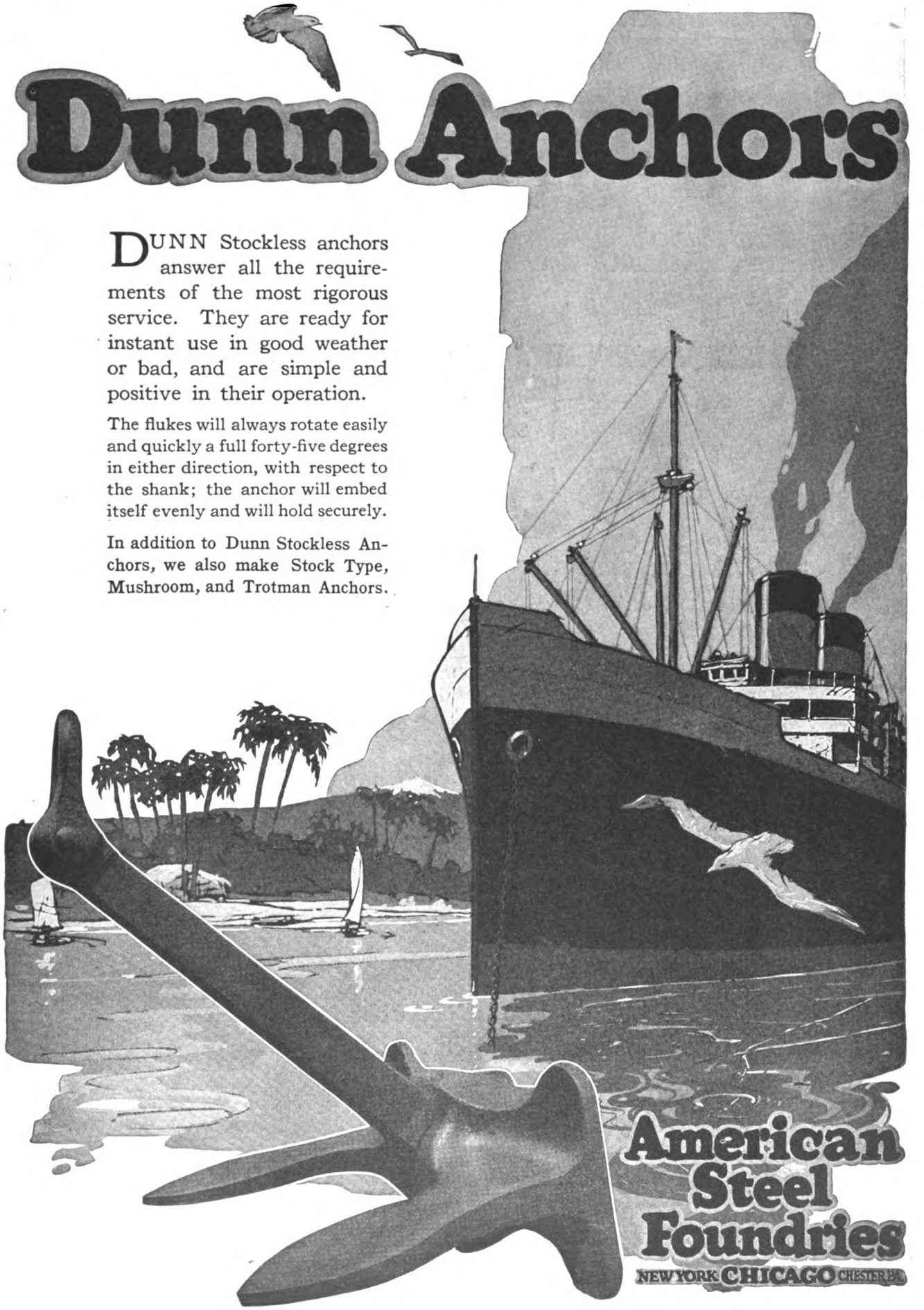

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A compounded oil made to saponify with water, for lubrication of reciprocating engines and auxiliaries where oiling is done by hand or through wick feed or drop oilers; also thrust bearings.

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A heavy mineral steam cylinder oil possessing fine lubricating qualities, for use on piston and valve rods.

Texaco Marine Turbine Oil M
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Texaco Turbine Oils Medium and Heavy are especially manufactured for the lubrication of Marine turbines with reduction gears. Both oils pass the emulsion test of the U. S. Navy and also have an excellent cold test and work very satisfactorily in gravity as well as force feed systems.

Texaco Ursa Oil

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A medium bodied oil recommended for lubrication of small turbines and small enclosed engines of the crank case type.

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TEXACO REFRIGERATING OIL—C is a medium bodied oil with a very low cold test and is recommended for compressor and expander cylinders of ammonia machines.

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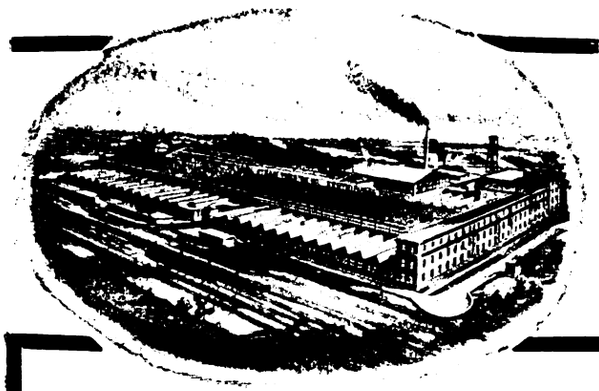

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DE LAVAL marine turbines are of the pure impulse type with large clearances, which permits quick manœuvring. Ample reversing power is provided in all cases.

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All De Laval apparatus is built to limit gauges on an interchangeable basis. Parts subject to wear are easily and quickly replaced.

De Laval turbines and gears are built to the requirements of Lloyd's Register of Shipping.

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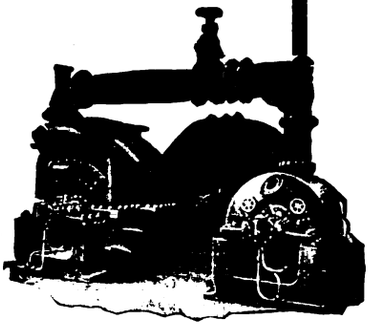
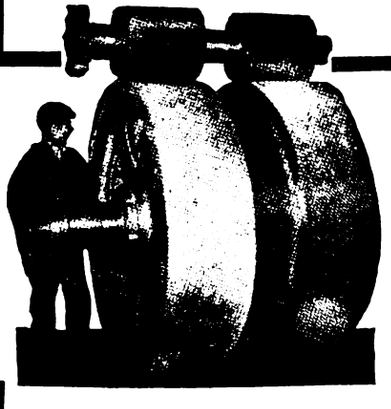


2500 H. P. compound single geared propelling unit.



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De Laval Steam Turbine Co.

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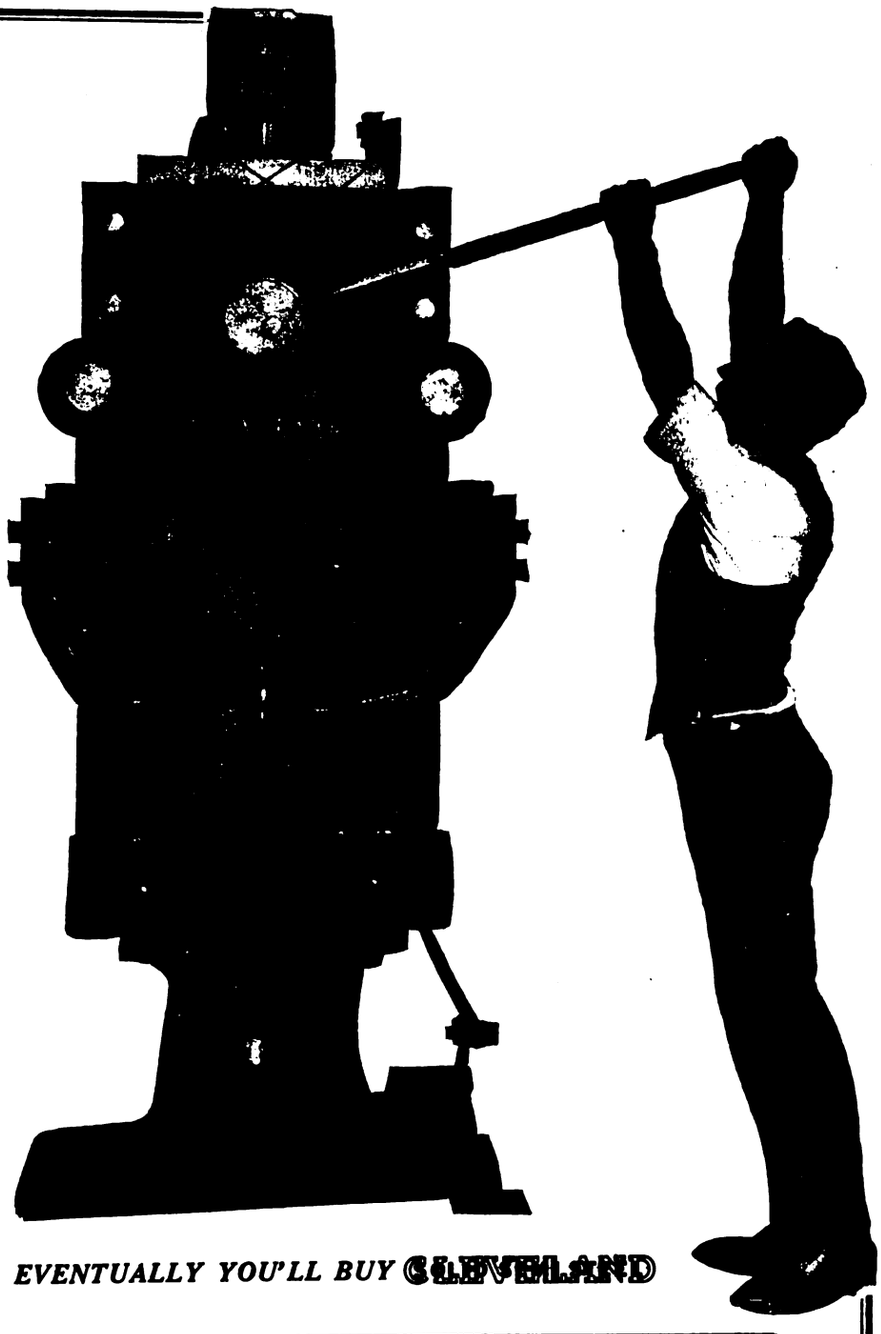

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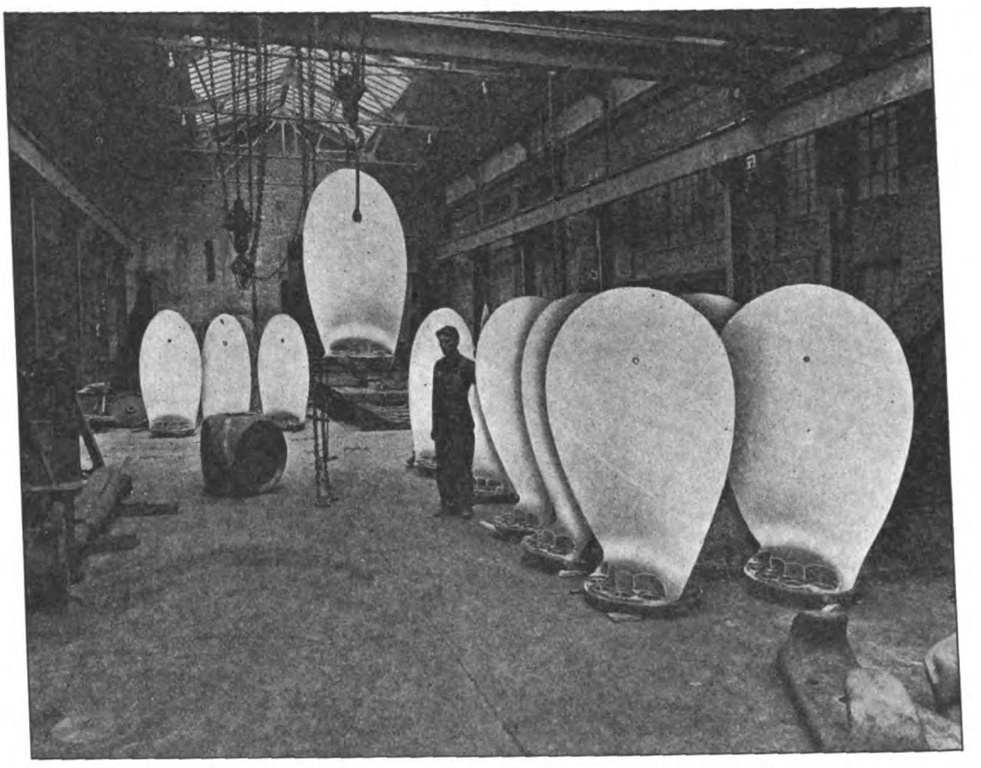

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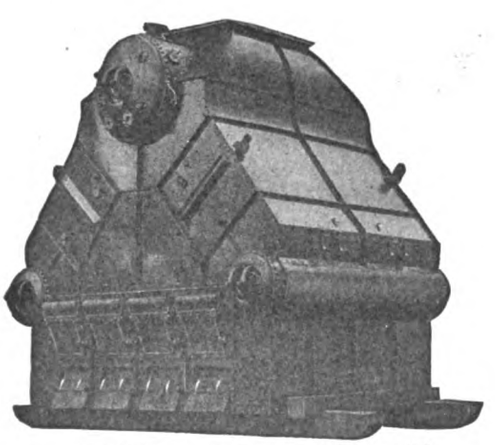

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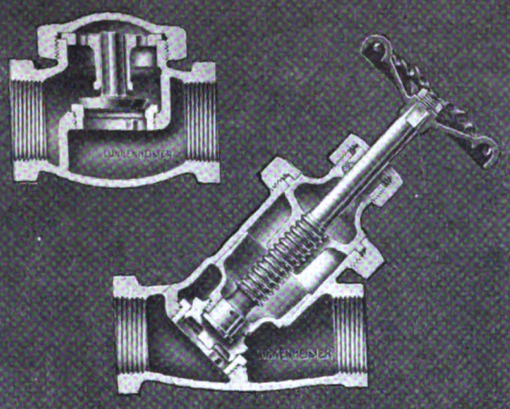
LUNKENHEIMER "RENEWO" VALVES



Have achieved an enviable record for economy in steam service. They represent the highest development in valve construction, incorporating all the good features discovered and developed in over half a century of valve manufacture.

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"Renewo" Valve parts are made of materials best suited to the duty the part performs.

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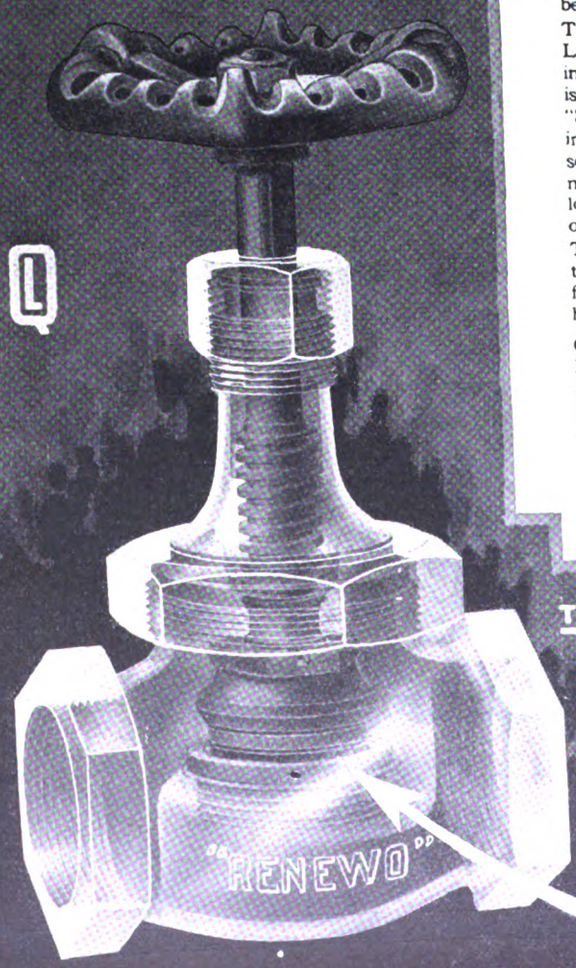

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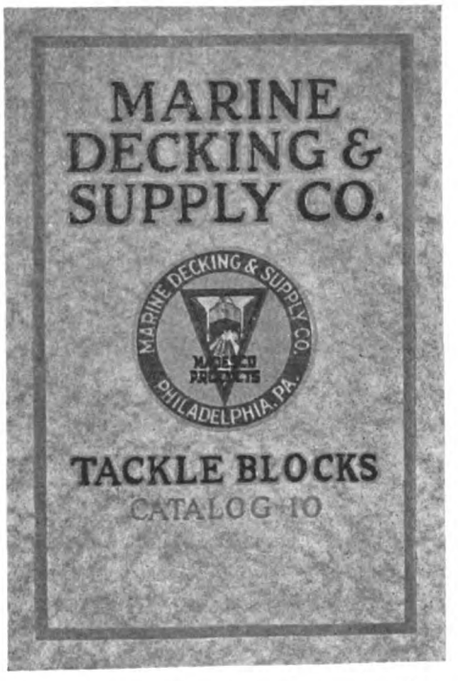

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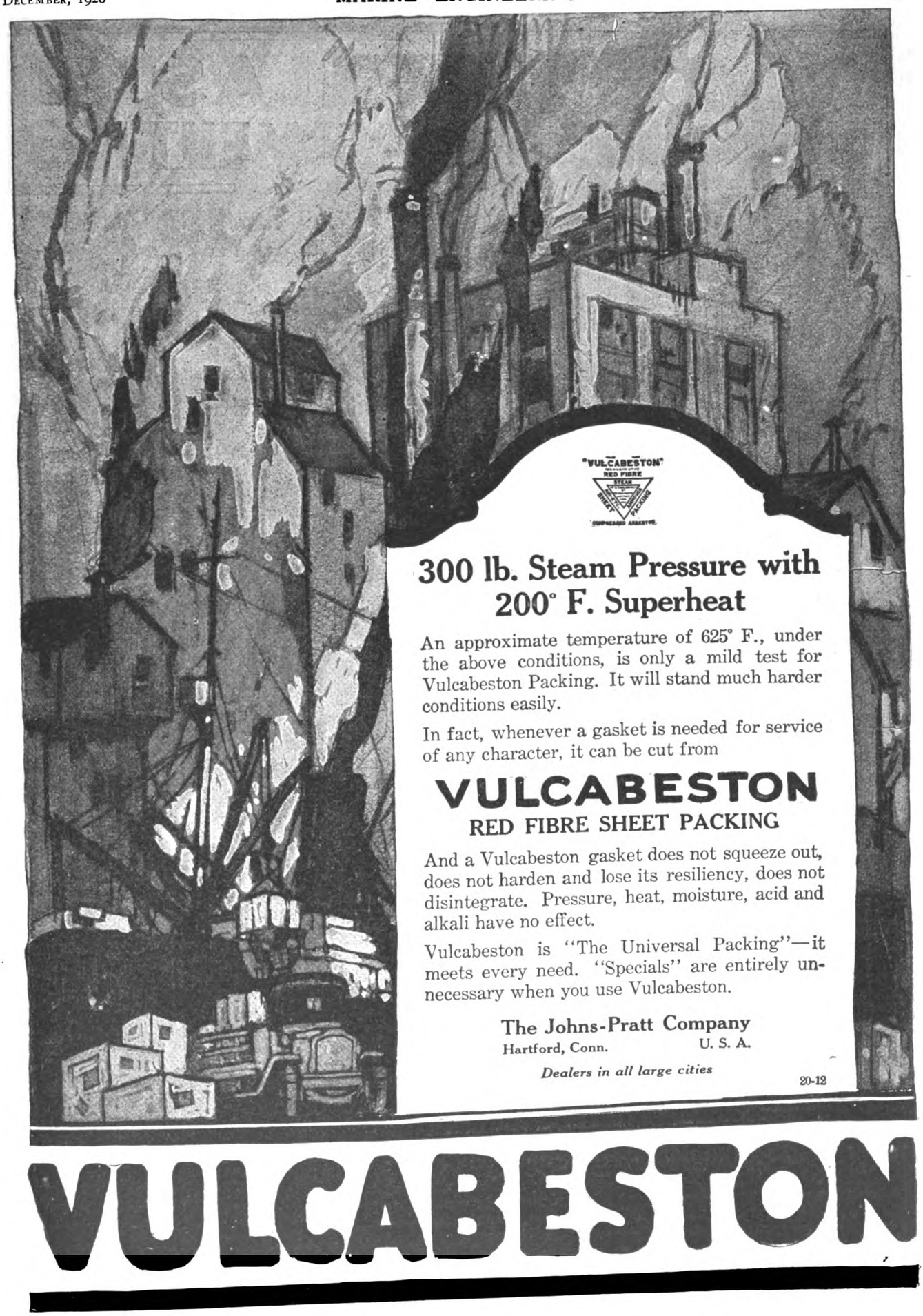
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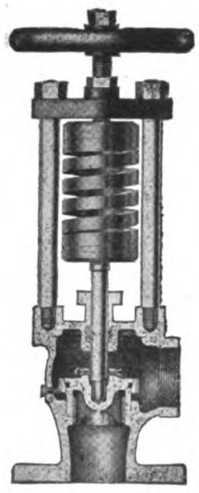

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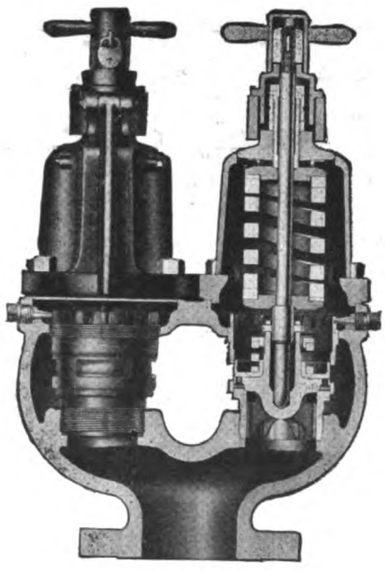

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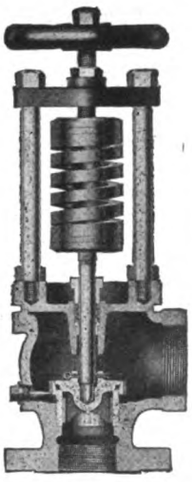

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For Marine Service

meet all existing requirements of the Board of Supervising Inspectors, Department of Commerce, The American Bureau of Shipping, and Lloyd's Register.

They are made with ferrosteel or cast steel body, and may be used for salt or fresh water and steam relief on shipboard.

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CRANE LIMITED — MONTREAL, TORONTO, VANCOUVER, WINNIPEG, LONDON, ENG., SYDNEY, N. S. W., QUEBEC, HALIFAX, OTTAWA, CALGARY.

We are manufacturers of about 20,000 articles, including valves, pipe fittings and steam specialties, made of brass, iron, ferrosteel, cast steel and forged steel, in all sizes, for all pressures and all purposes, and are distributors of pipe, heating and plumbing materials.

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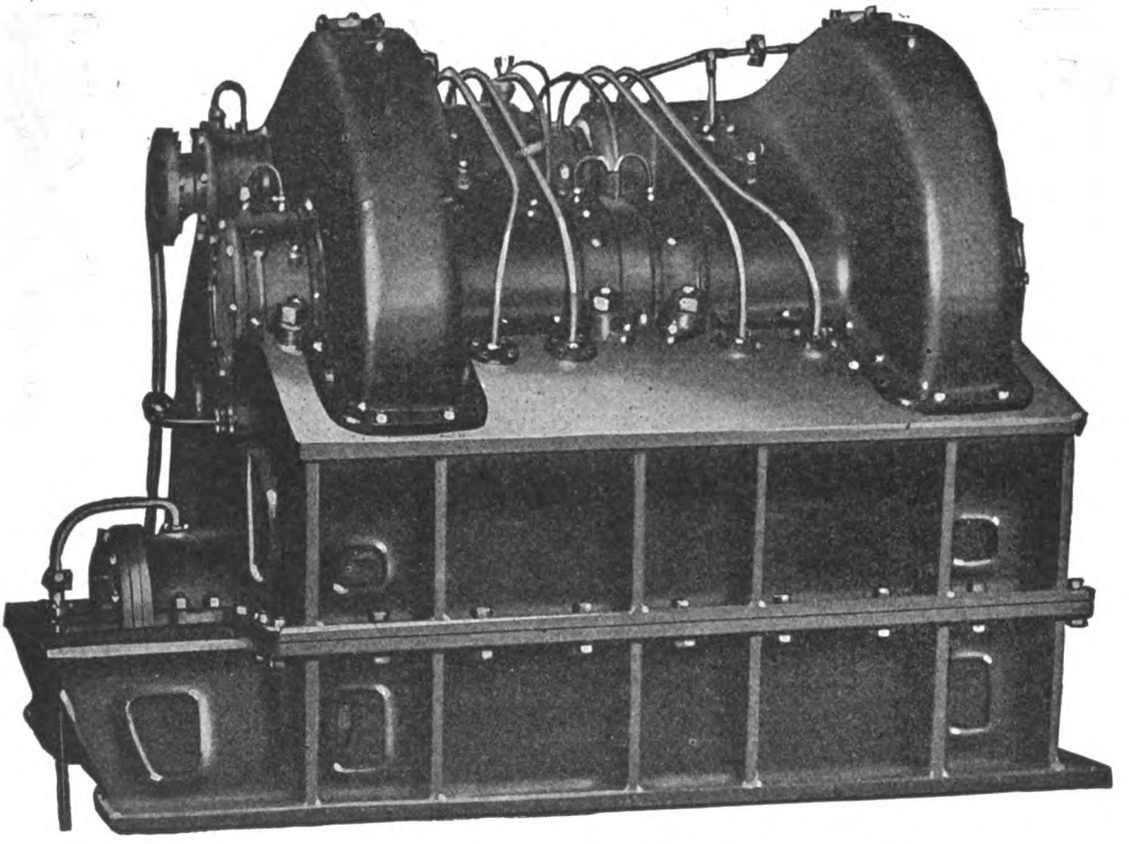
We furnished twenty of these Units early this year.



Side View of Double Reduction Marine Gear for Single Turbine Drive, 1500 H.P., 3600 to 90 R.P.M., including Kingsbury Thrust Bearing.

"We have recently received additional contract for fifty-nine to the same design."

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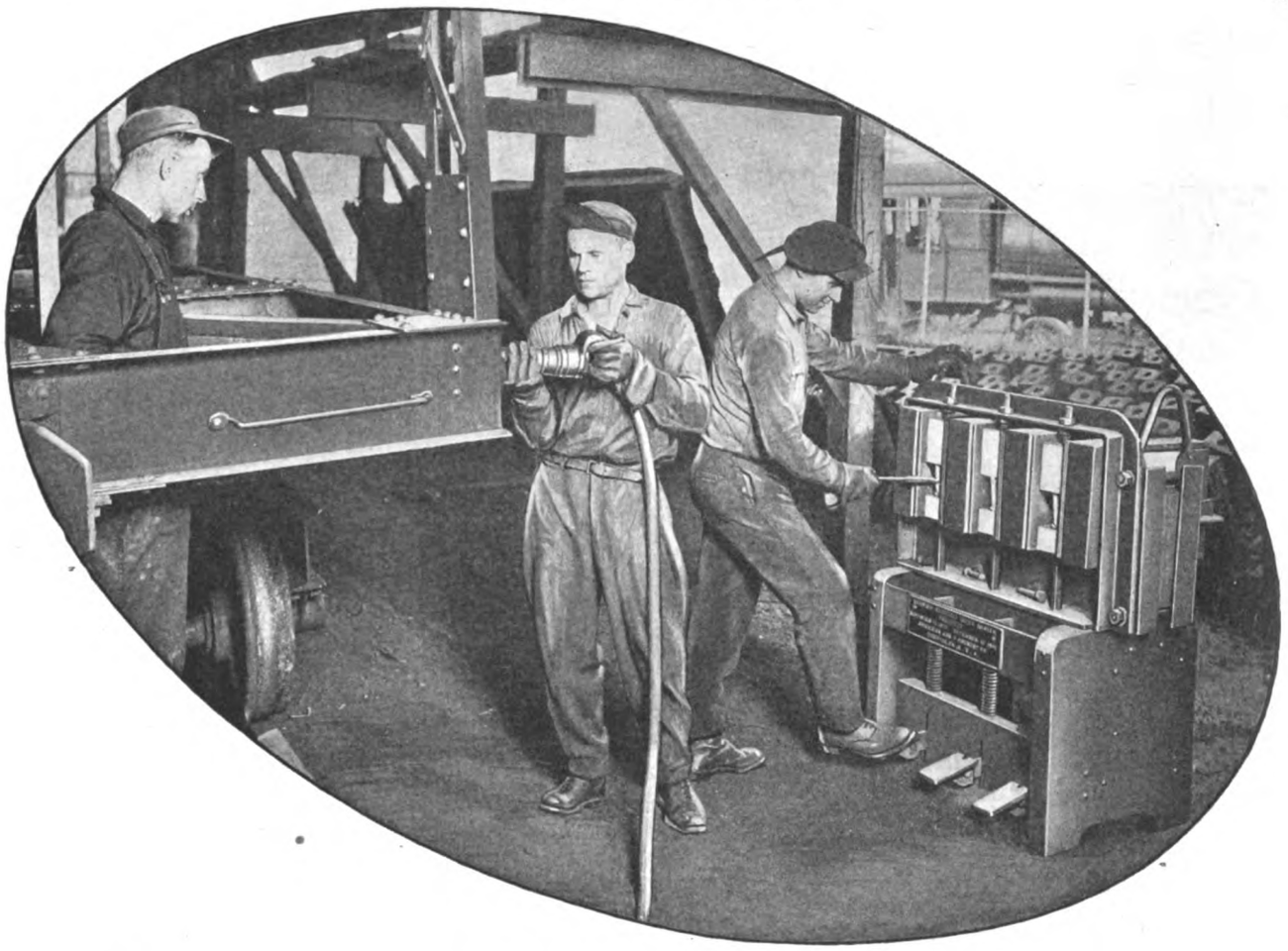

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No waste of rivets. The boy (or girl) who operates the Berwick Electric Rivet Heater can see the rivets being heated. This prevents burning and scaling losses—a saving which averages 40 cents per hundred pounds of rivets heated.

No waste of power. The Berwick uses power only when actually heating rivets—less than 20 kilowatt-hours per hundred pounds of rivets heated. There is no waste of power when the machine is not operated at full capacity.

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BERWICK ELECTRIC RIVET HEATER

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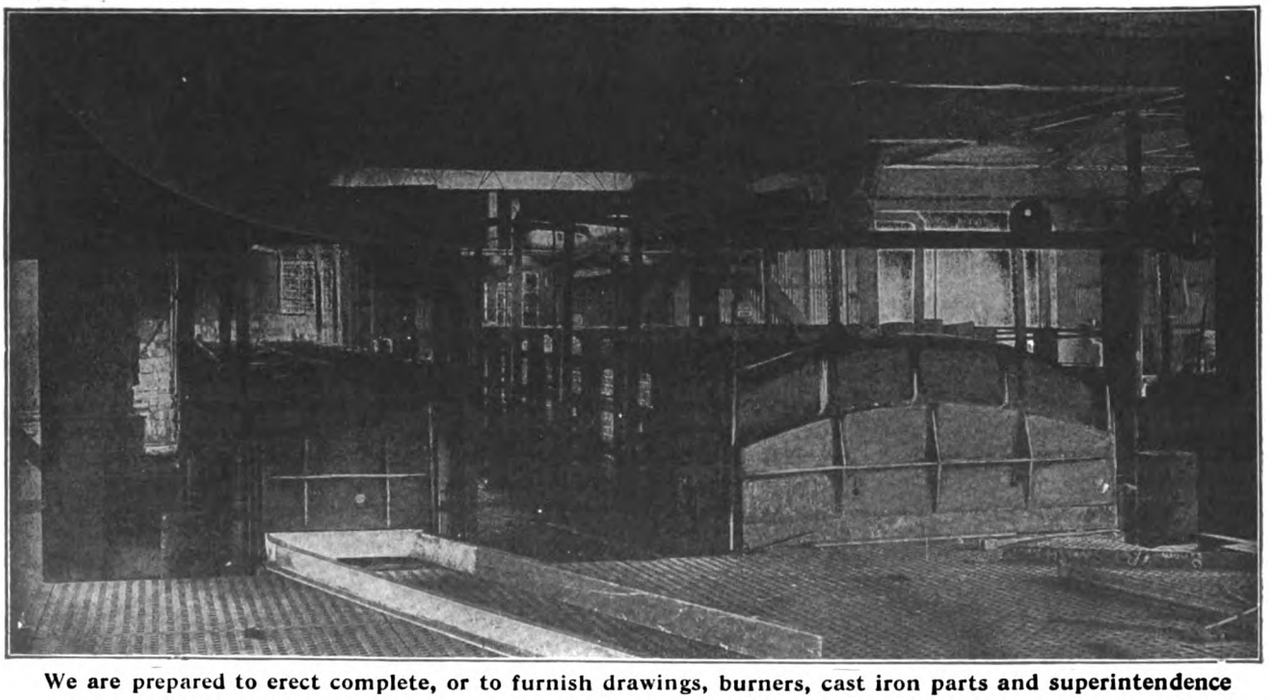

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WE ALSO MAKE

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A diver being raised to the deck after a record-breaking descent in a steel suit weighing hundreds of pounds

When We Raid Davy Jones' Locker

A LEADING maritime expert has said that when the United States establishes a large merchant marine it must, to obtain reasonable insurance rates, maintain an efficient salvage division.

Salvage brings instantly to mind the diver. And the diver's life and efficiency rests almost entirely on the hose that brings him air. When you stop to consider that the pressure 280 feet below water is 130 pounds to the square inch, or approximately 270,000 pounds upon the entire body (the weight of a large freight locomotive), you can see why no end should be spared to get hose that is absolutely dependable.

Goodrich makes hose for all marine purposes

Goodrich Divers Hose

Such hose is Goodrich Divers Hose. For a half-century we have been making hose—and no single piece is studied and worked with more care than divers hose. Not only does the best rubber and fabric go into it—but we incorporate a rubber vitality that assures the same safety after months of service as when first used.

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Best in the Long Run

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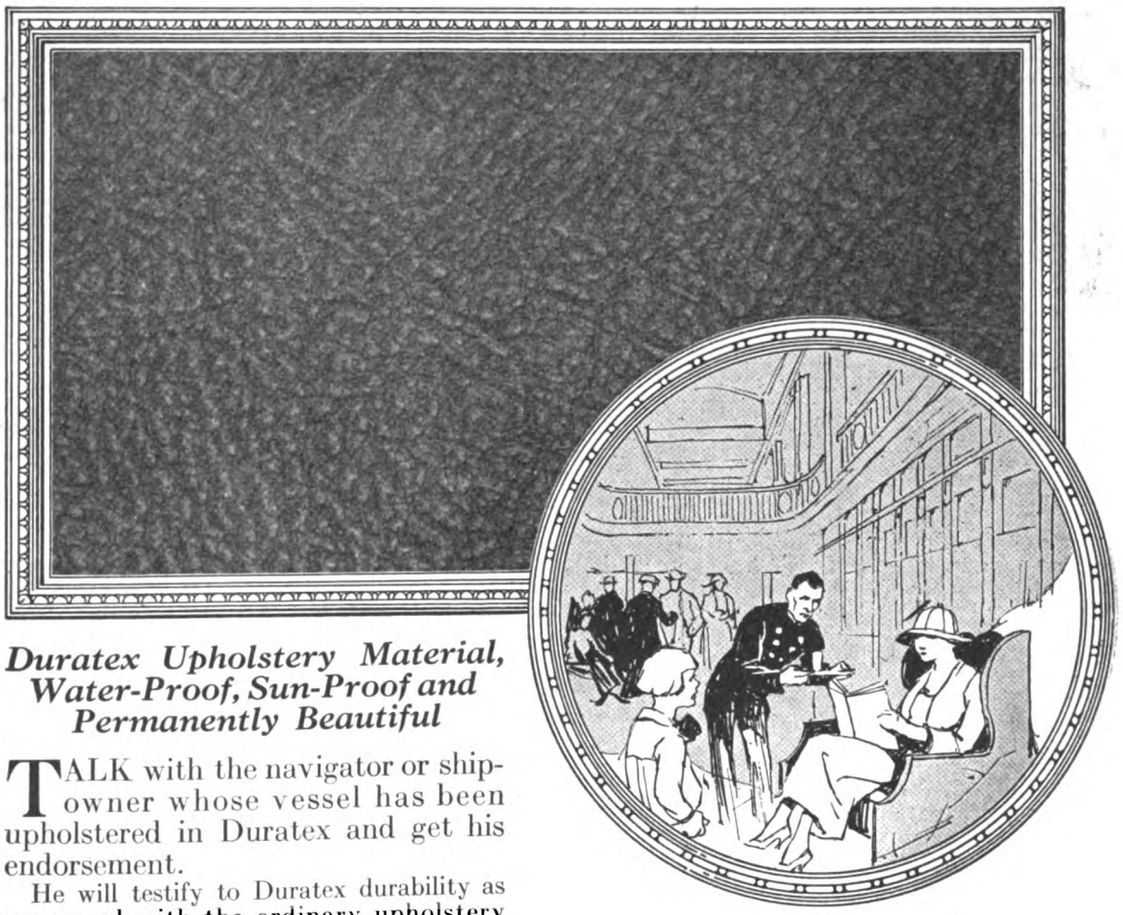

Duratex Upholstery Material, Water-Proof, Sun-Proof and Permanently Beautiful

TALK with the navigator or ship-owner whose vessel has been upholstered in Duratex and get his endorsement.

He will testify to Duratex durability as compared with the ordinary upholstery materials he has previously used.

Duratex is water-proof and sun-proof. No amount of salt water can discolor it. No blistering sun will cause it to become sticky. It is moth and mill-dew proof and will not fade.

Duratex is made in a variety of rich colors to match any decorative scheme. It retains its beauty *permanently*.

Write for samples and prices.

The DURATEX COMPANY
President

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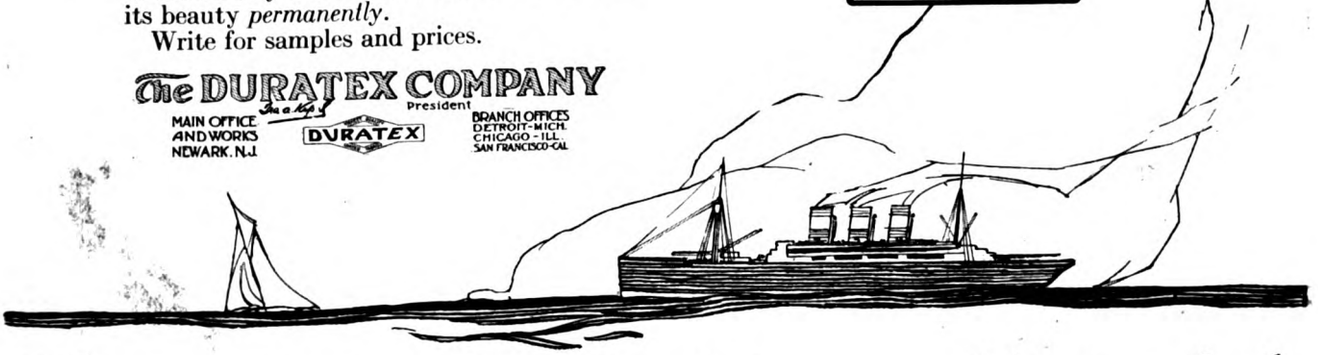
Look for the Duratex Gold Label. It is the Sign of Genuine Duratex



The Better Upholstery Material

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BRADLEY HAMMERS

Never Idle in This Shop

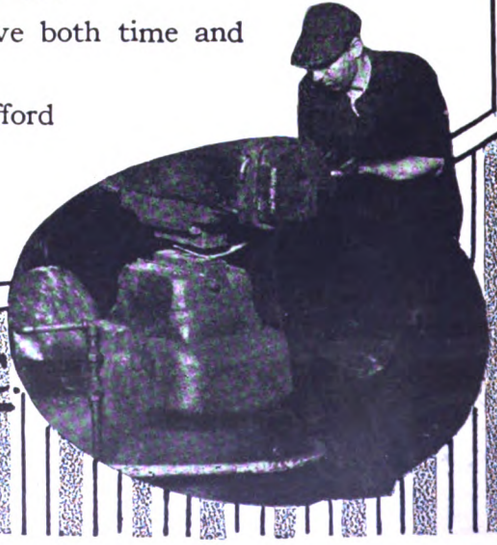
The general utility of Bradley Hammers is reflected in the great number of jobs handled on this sturdy tool.

In shops where production demands are exacting—where work must be finished in a workmanlike manner—where delays are not tolerated, the name "Bradley" has a definite meaning.

The men like to use Bradley Hammers. They deliver maximum output with the minimum of effort. Bradley Hammers are never idle—it's one tool where you will find workmen waiting their turn to use.

One or more "Bradley's" in your shop will prove both time and labor savers—will speed up things generally.

Let us show you why you cannot afford to be without it.



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SYRACUSE, N. Y.
ESTABLISHED IN 1832

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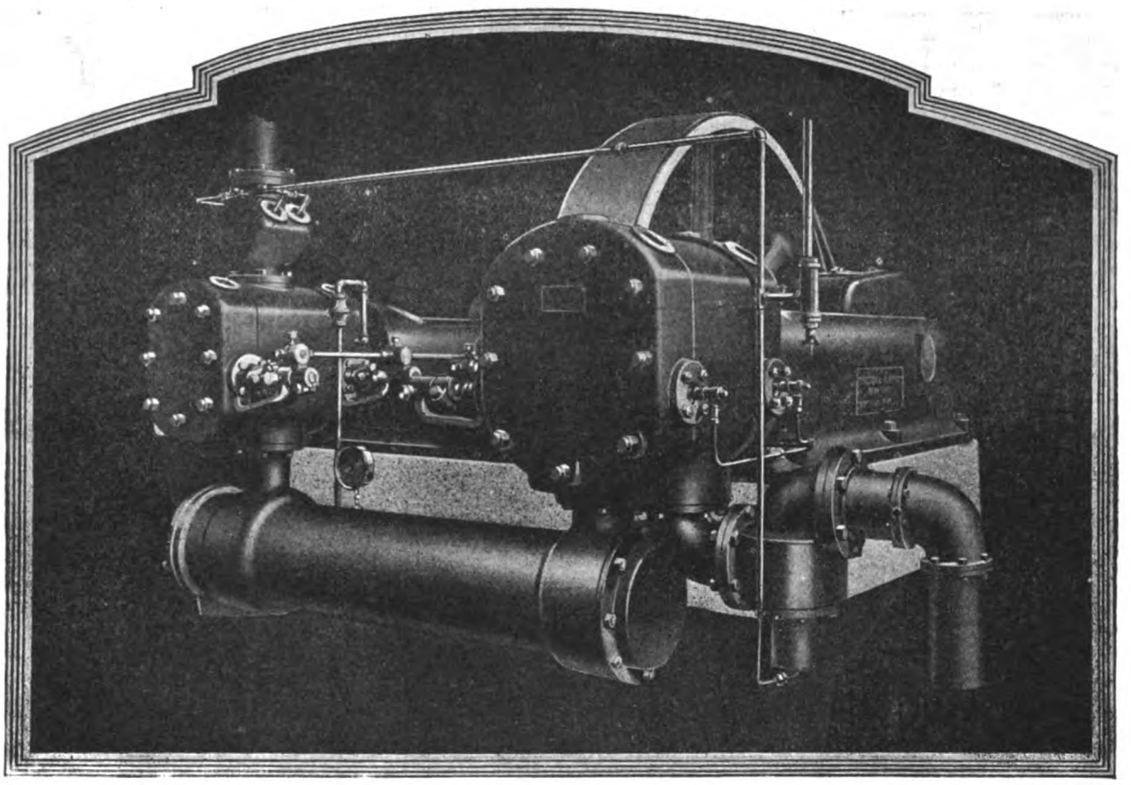

Does the cost price determine your air compressor selection, or have you decided from experience that low first price often means an expense, rather than an investment?

The air compressor should increase your production, reduce your manufacturing costs and help you realize a profit. It must be a machine you can afford to use—run when you need it and require the least possible attention.

Broken parts mean repair parts, lost running time and interruption. A cog is thrown into the wheels of progress and the compressor ceases to earn and becomes a troublesome expense.

The efficient compressor produces air at the least cost per cubic foot actually delivered, taking into account the costs of power, attendance and repairs. It is economical of floor space, without sacrificing accessibility or strength.

It has reliable regulation, so that the load is automatically on or off depending upon the demand for air. Lubrication is automatic and reliable but economical.

Such are Ingersoll-Rand Compressors. Also, in all I-R compressors—belt, steam or direct-connected electric drive—the driving medium is given equally careful attention.

For belt drven units of medium size it will pay you to look into the "Imperial" XB Compressors, shown in the above illustration. This is fully described in Bulletin No. 3312. Let us send you a copy.

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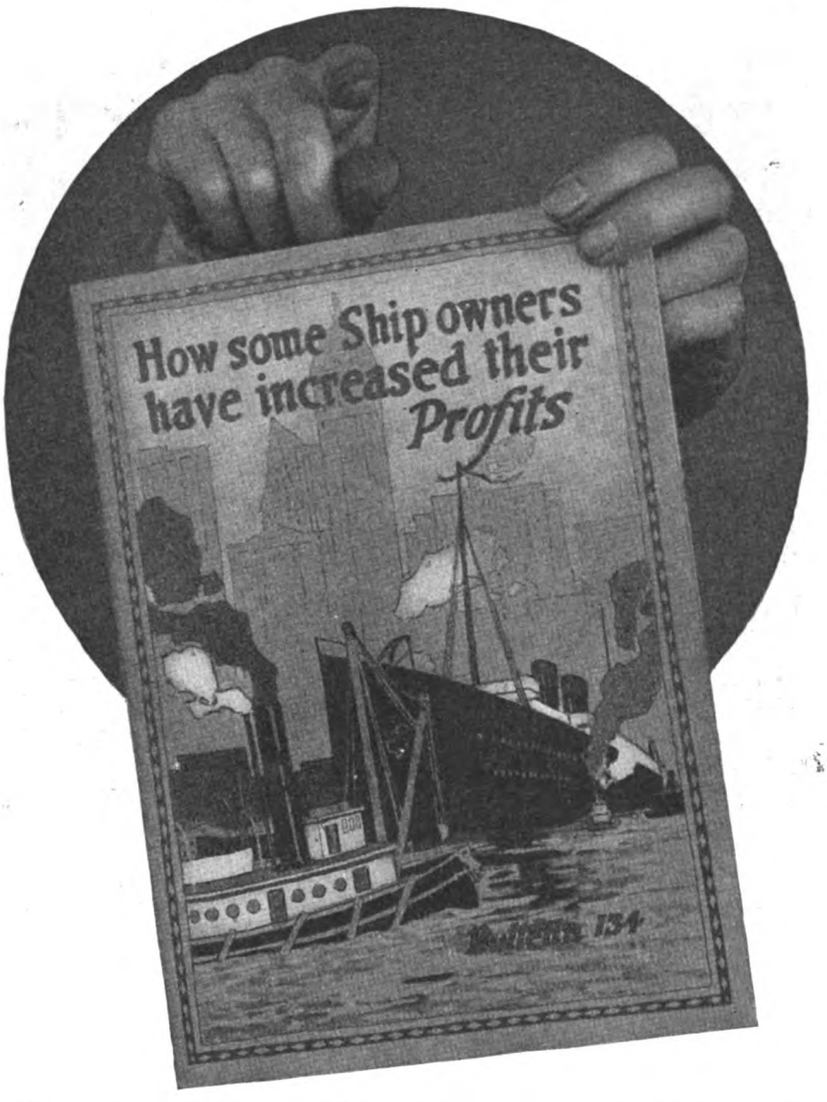

Are YOU Responsible For Vessel Operating Costs?

If you are responsible for vessel operating costs—and you **ARE** responsible if your position is that of owner, manager, superintending engineer, chief engineer or assistant engineer—you will want this book.

It discusses the marine boiler-room problem from the point of view of the man who must show profits at the end of the year. Fuel consumption charts, records of boiler tests, and bookkeepers ledger sheets are shown.

In particular, the book deals with one big profit-absorbing loss—SOOT. Soot, as found in marine boilers is the best heat insulator known. It is five times as effective as asbestos in preventing heat transference. It is the black profit taker—causing an average direct loss of 100 lbs. of fuel out of every ton burned.

Finally, the book describes Diamond Soot Blowers and their functions and performance in the elimination of soot losses, which cost the steamship operators of the country millions of dollars annually in needlessly burned coal and oil.

This book is yours for the asking, just pencil your name on the coupon.

DIAMOND POWER SPECIALTY CO.

DETROIT, MICHIGAN

Diamond Power Specialty Co., Detroit
Please send my copy of "How Some Shipowners Have Increased Their Profits" to
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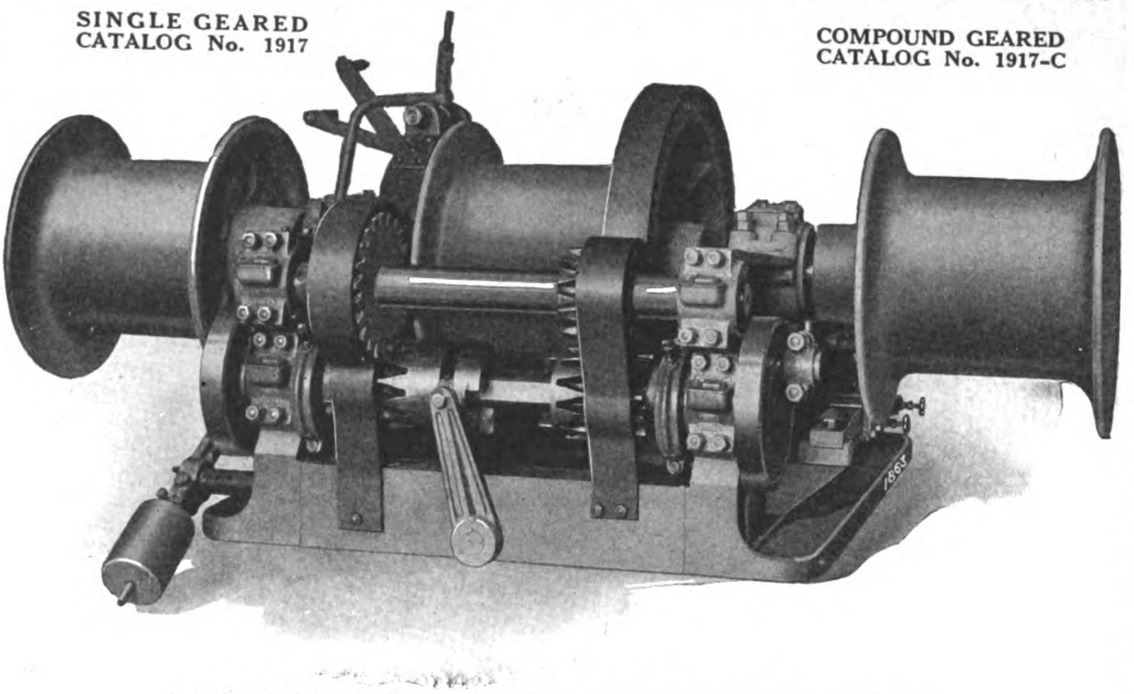
LIDGERWOOD STANDARD WINCHES

SHIP AND DOCK WINCHES—TOWING ENGINES—STEERING ENGINES

SINGLE GEARED
CATALOG No. 1917

COMPOUND GEARED
CATALOG No. 1917-C



LIDGERWOOD COMPOUND GEARED CARGO WINCH No. 1917-C

Drum holds 800 feet of ¾" rope and delivers a line pull of 10,000 lbs. with drum full of rope.

Built for handling a 30 Ton Boom with eight part purchase.

Light Loads at High Speed, Heavy Loads at Slow Speed.

Simple in control.
One lever hoists, holds and lowers.
All gears steel.
All parts interchangeable.

Lidgerwood Compound Geared Cargo Winch No. 1917-C is exactly interchangeable on the same bedplate and pipe flanges with Lidgerwood Standard No. 1917 Winch, over 6000 of which have been constructed and sold.

Send for catalog MARINE MACHINERY

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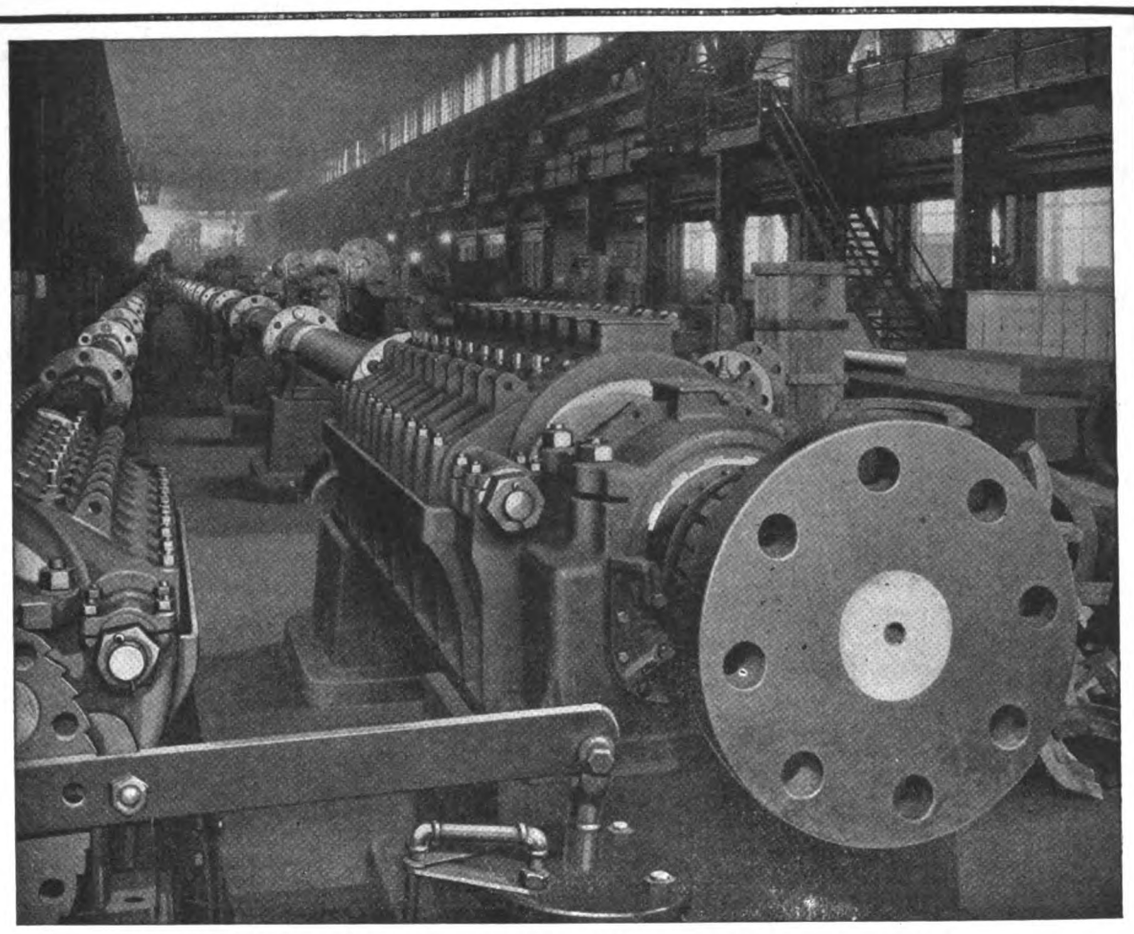
MESTA
SHIP SHAFTING



Ship Shafting on Erecting Floor finished complete and assembled ready for shipment

MANUFACTURED COMPLETE IN THE MESTA PLANT
FROM RAW MATERIAL TO FINISHED PRODUCT

Rough turned or finished complete ready for installation

INGOTS—Acid Open Hearth Steel Forging Ingots of the fluted type with hot tops used exclusively.
FORGINGS—Made under Mesta patented Steam-Hydraulic Forging Pressure.
HEAT TREATING—All forgings annealed, quenched or otherwise heat treated as the specifications may require.
MACHINING—Carefully done on machine tools especially provided for the purpose.
ASSEMBLING—A specialty is made of finished shafting completely assembled and accurately aligned ready for installation without any further work being necessary at the ship yard.

MESTA MACHINE COMPANY
PITTSBURGH PENNSYLVANIA

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A Master Feat
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The Biggest Boiler Tube Sheet Repair Job Ever Undertaken

In 60 days' time, we repaired 26 tube sheets by electric welding on the S. S. Von Steuben. After steaming 60,000 miles all bridges were found to be intact.

1st Method | 2nd Method | 3rd Method

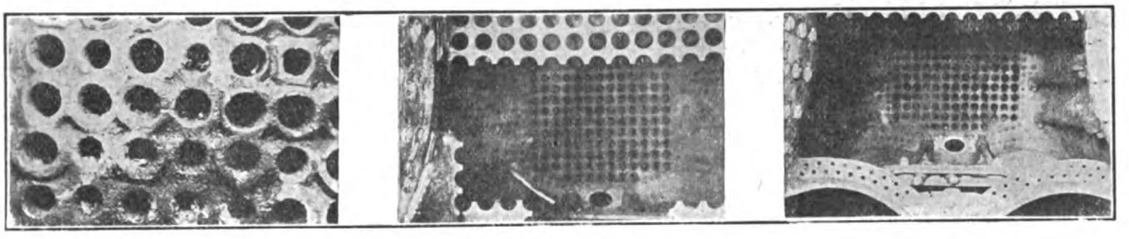

Fig. 1 Original Plate

Fig. 4 Second method of cutting. Note short flange.

Fig. 7. 3rd method of cutting out plate completely flanged.

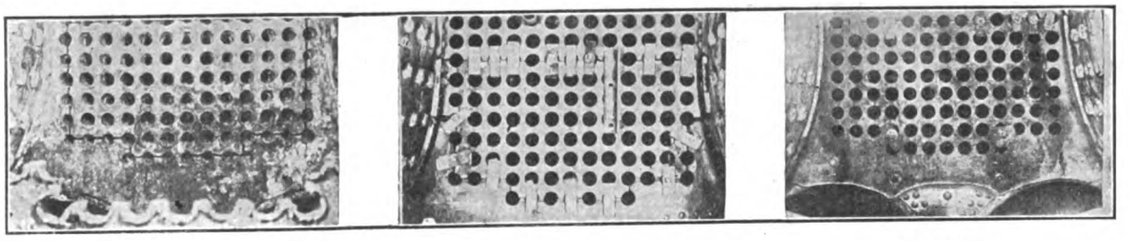

Fig. 2 Combustion chamber plate cut before removal.

Fig. 5 New section of sheet ready for welding and riveting.

Fig. 8 Sheet bolted in place for welding 3rd method.

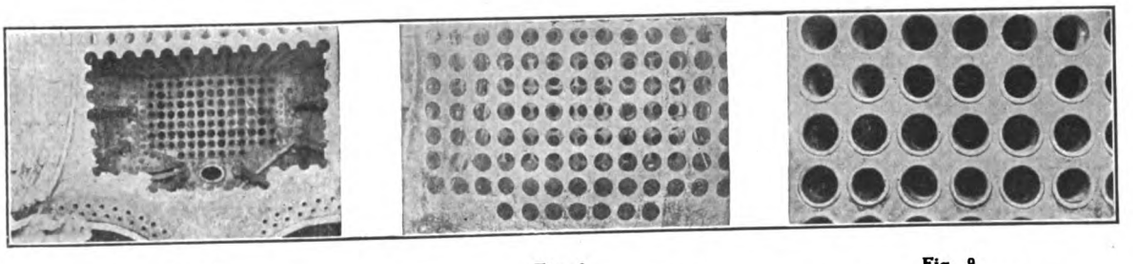

Fig. 3 Entire plate removed by 1st method.

Fig. 6 Welding completed with tube holes reamed and tapped.

Fig. 9 Section of completed sheet.

To successfully accomplish such a proposition as is illustrated above, it is necessary that man power be skillful, resourceful and thoroughly competent and that facilities be thoroughly complete. Morse Service is performing remarkable feats almost daily and saving ship owners both time and expense. Write for literature and further details.

MORSE DRY DOCK & REPAIR CO.

Phone, Sunset 5100 **BROOKLYN, N. Y.** **Cable, Pyrosison, N. Y.**

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WASTING COAL COSTING $22.00 A TON OR SAVING $3.30 A TON

A whole ship load of coal sold in Boston recently for $22.00 a ton.
You may not be paying as much for your coal or as proportionately high for fuel oil—perhaps you pay more.
Whatever you pay, you waste fuel when your ships operate on saturated steam and waste is inexcusable when a practical means to save it is available. When ships operating on saturated steam are converted into the economical class by the application of Elesco Fire Tube Superheaters, a saving of upwards of 15% in fuel is realized. With coal at $22.00 a ton, this represents a saving of $3.30 a ton, or $3,300 on a 1000 ton bunker capacity.
Fire Tube Superheaters may be installed while the ship is in port taking cargo. More cargo space is available on ships equipped with Fire Tube Superheaters, because less **bunker space is required.** Less fuel in bunkers means less weight of fuel to be carried.
Our Bulletins explain the advantages of high degree superheat—advantages which have been considered worth while in over 2000 ships.

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GENERAL OFFICES: 30 Church St., New York City
CHICAGO—Peoples Gas Building
Designing Engineers and Manufacturers of ELESCO Steam Superheaters and Pipe Coils for all purposes

FIRE TUBE SUPERHEATERS

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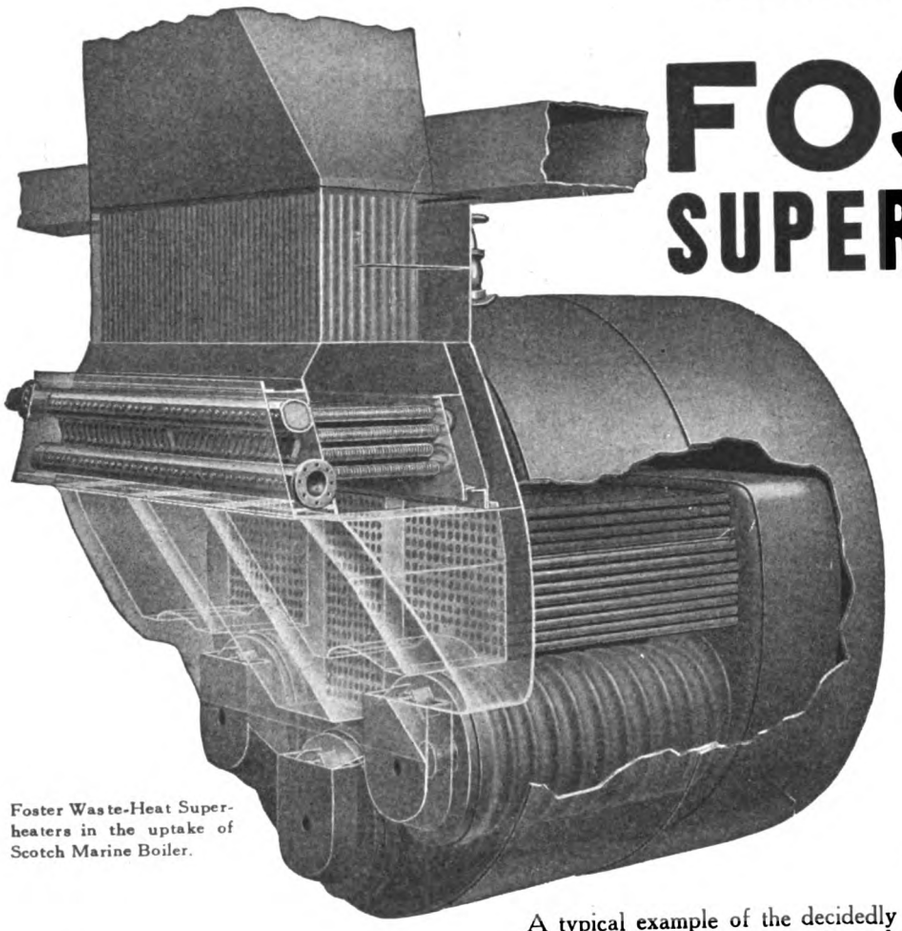
How 38 deg. of superheat saved 10% of fuel



Foster Waste-Heat Superheaters in the uptake of Scotch Marine Boiler.

FOSTER SUPERHEATERS

A typical example of the decidedly worth-while saving in fuel accomplished by moderate superheat was shown during the recent trip of a 9000-ton Foster Superheater-equipped cargo ship. This vessel is fitted with a 3500 I. H. P. reciprocating engine, 3 Scotch marine boilers 14 ft. dia. x 11 ft. 6 in., and has Foster Waste Heat Type Superheaters for 40 deg. superheat.

Twenty-four hours after the ship left the dock the superheaters were by-passed, and the engine was run for 3 days with saturated steam, averaging 182 barrels of oil per day. In the next 3 days, the superheaters were put in the line, superheating the steam 38 deg. With the same ship's crew maintaining all other operating conditions as before, the average fuel consumption was 163 barrels per day.

The actual saving in fuel accomplished by 38 deg. of superheat was 19 barrels of oil per day, or over 10%.

We are prepared to show you just how much Foster Superheaters can improve the fuel economy of ships in which *you* are interested. Send for the Foster Superheater Catalog and ask for full information.

Send for Bulletin 103.

POWER SPECIALTY COMPANY

Foster Superheaters for Marine and Stationary Boilers and Locomotives

General Offices: 111 BROADWAY, NEW YORK

Boston Philadelphia Pittsburgh Chicago San Francisco London, England

Works: Dansville, N. Y., and St. Albans, Hertford, England

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LUKENS HAVE

Just What You Want When You Build a Boat

Marine Steel

We can supply rectangular plates up to 195″ wide so that you may cut out some troublesome seams.

Flange Steel

We were the first to roll a boiler plate in America, so our product is backed by over 100 years' experience.

Boiler Heads

On the World's Largest Plate Mill we roll flat circles up to 199″ diameter and on our spinning flanging machine we flange them to 15′ 3″ outside diameter all in one piece, which as you can realize is a big advantage as it cuts out seams and you know the head has been flanged all at one time and no local strains have been set up as in hand flanged, two-piece heads.

Marine Fittings

The Lukens Marine Manhole Door has the approval of Lloyd's Register of Shipping, American Bureau of Shipping, and Bureau Veritas and its size is 12″ x 16″. You'll like them.

Lukens Steel Company

Coatesville, Pennsylvania

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SELLING AGENCIES

A. M. Castle & Co., Chicago San Francisco Seattle Los Angeles Rock Island Minneapolis Milwaukee Detroit Portland

J. F. Corlett & Co., Cleveland Cincinnati

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 165 BROADWAY, NEW YORK, U.S.A.

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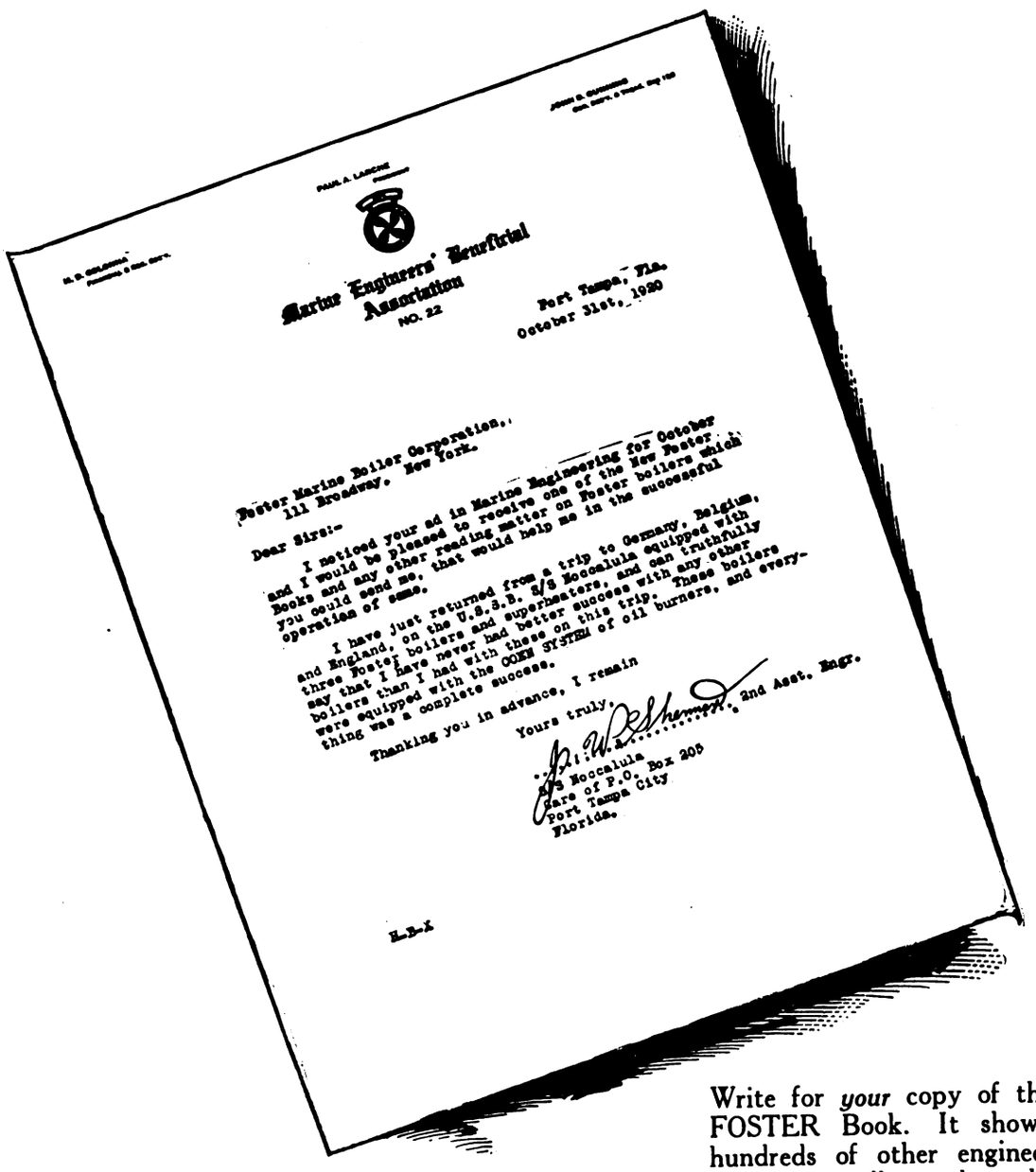
The experience of one operating engineer with

FOSTER MARINE BOILERS



Marine Engineers' Beneficial Association
NO. 22

Port Tampa, Fla.
October 31st, 1920

Foster Marine Boiler Corporation,
111 Broadway, New York.

Dear Sirs:-

I noticed your ad in Marine Engineering for October and I would be pleased to receive one of the New Foster Books and any other reading matter on Foster boilers which you could send me, that would help me in the successful operation of same.

I have just returned from a trip to Germany, Belgium, and England, on the U.S.S.B. S/S Moccalula equipped with three Foster boilers and superheaters, and can truthfully say that I have never had better success with any other boilers than I had with these on this trip. These boilers were equipped with the COEN SYSTEM of oil burners, and everything was a complete success.

Thanking you in advance, I remain

Yours truly,

1st. Asst. Engr.

S/S Moccalula
Care of P.O. Box 205
Port Tampa City
Florida.

E.B.L

Write for *your* copy of the new FOSTER Book. It shows why hundreds of other engineers are securing equally good results with their FOSTER Boilers.

FOSTER MARINE BOILER CORPORATION

111 BROADWAY, NEW YORK

Branch Offices: Boston Philadelphia Pittsburgh Chicago San Francisco London, Eng.
Plants: Edgemoor, Del. Oil City, Pa. Springfield, Ill. Portland, Ore.

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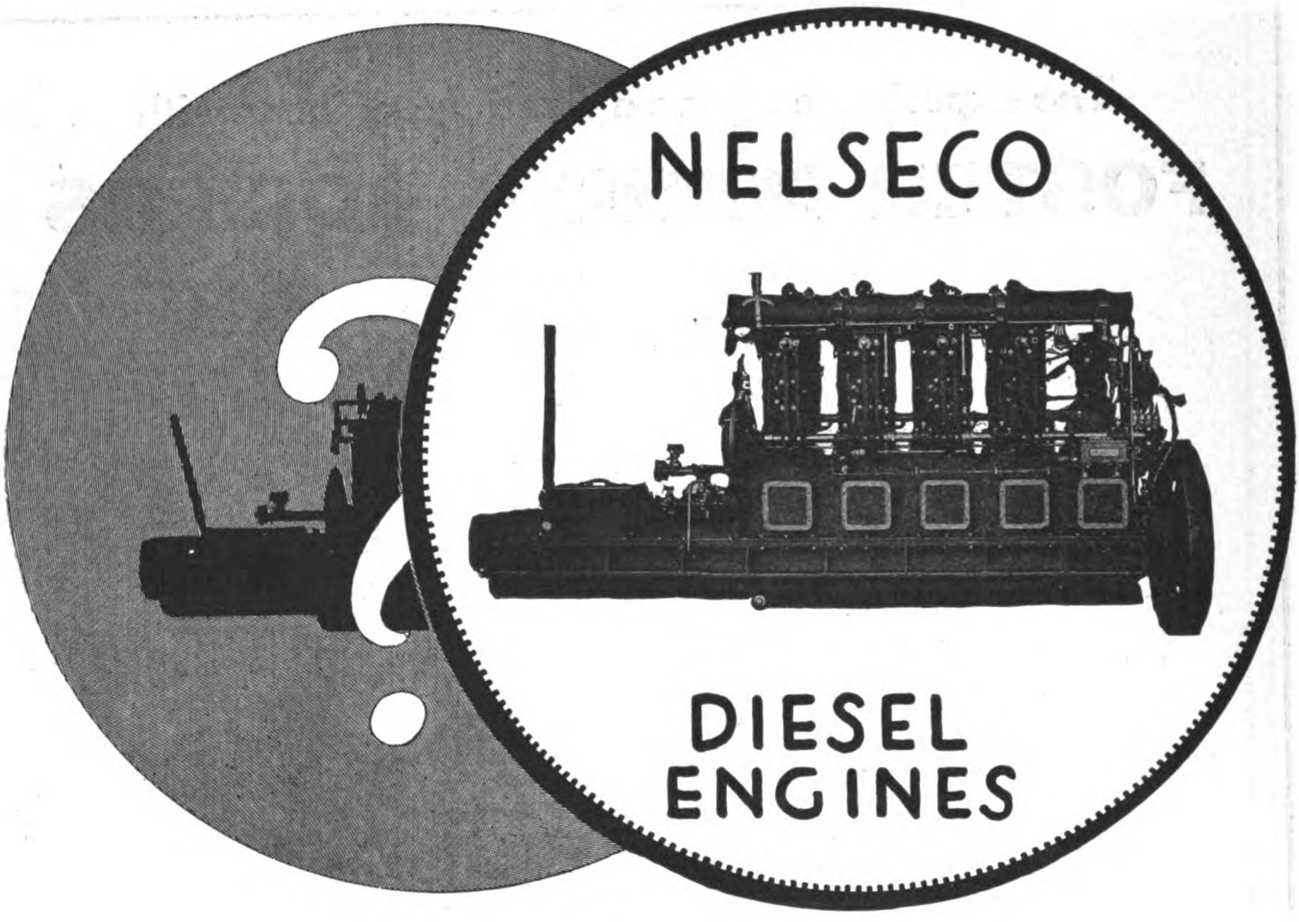

Certainty—

THE SHADOW OF DOUBT
NEVER ENTERS THE MIND OF USERS
OF
NELSECO
MARINE DIESEL ENGINES

GOLD MEDAL
HIGHEST AWARD
MARINE DIESEL ENGINES
Panama-Pacific Exposition

Ships thus equipped are propelled efficiently and dependably with as low fuel consumption as is possible to secure through any like operation. Over 150,000 H. P. now in service in American and Foreign Vessels or on order.

Sizes: 120, 180, 240, 360, 480 to 2000 B.H.P.

NEW LONDON SHIP & ENGINE CO., Groton, Conn., U. S. A.

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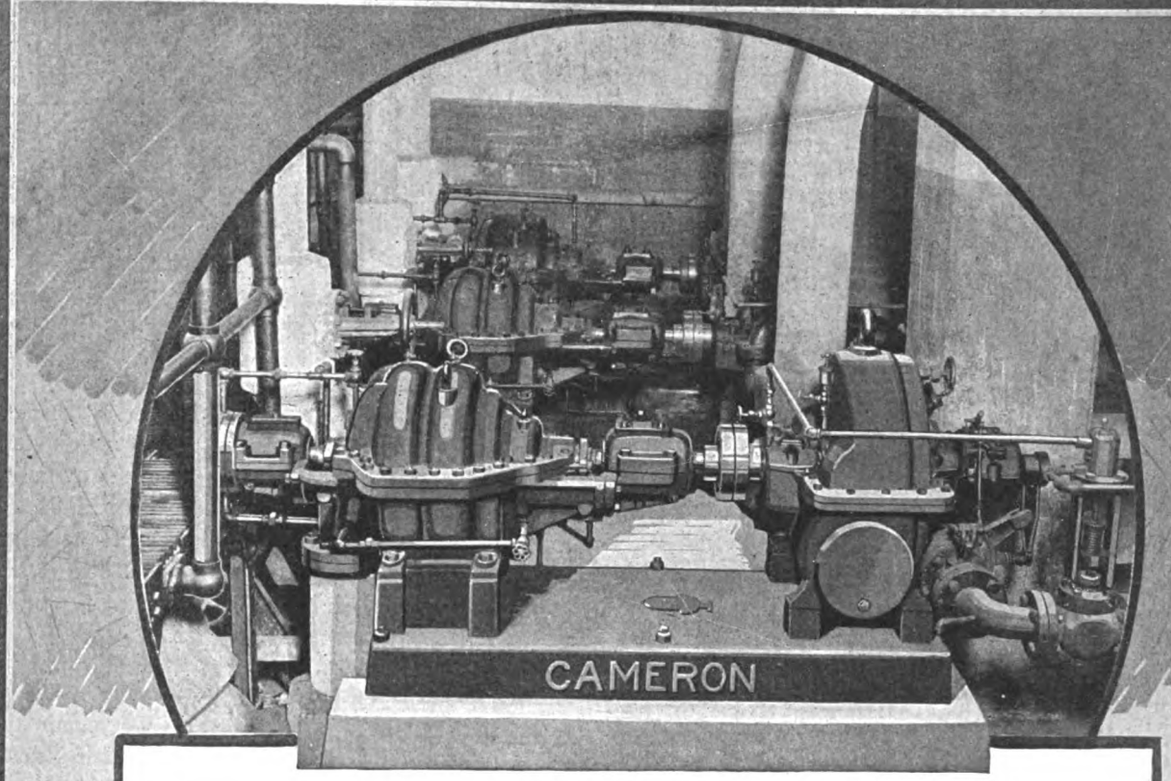

The initial cost is only one item in the determination of pump expense.

Accurate records over a period of years, showing initial and upkeep cost, power consumed, and expense of lost operating time, conclusively demonstrate economy of Cameron Pumps.

For true economy specify Camerons.

A. S. Cameron Steam Pump Works

11 Broadway, New York

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CAMERON PUMPS

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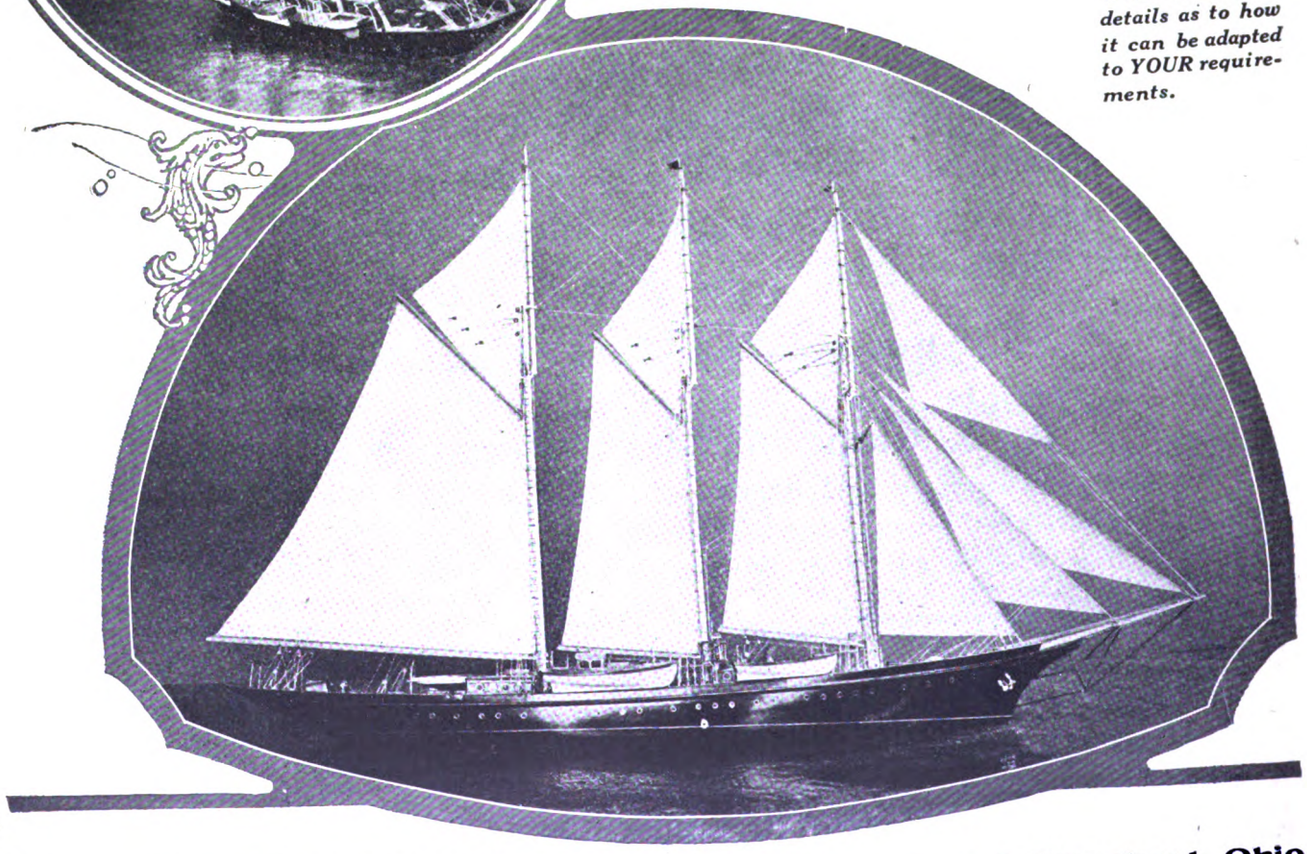
Another Winton Diesel-Electric Drive

Mr. Edgar Palmer's new "Guinivere" is equipped with a pair of six cylinder 13″ x 18″ Winton Diesel Engines, each direct connected to a 225 K. W. Westinghouse Generator, which in turn supply electric power to a 550 H. P. electric motor installed in the stern, giving the boat a speed of 11½ knots under power.

"Guinivere" was designed by A. Loring Swasey, constructed by Geo. Lawley & Son Corp., and is the largest fore and aft Auxiliary Schooner Yacht ever built, 195′ O. A. 52′ 5″ Beam. 15′ Draft

This system of Winton Diesel Electric Drive is becoming increasingly popular.

Write or wire for details as to how it can be adapted to YOUR requirements.



WINTON ENGINE WORKS, - - - - - - - - - Cleveland, Ohio

New York: A. G. Griese, 120 Broadway; Seattle: H. W. Starrett, Sunset Engine Co.; San Francisco: F. G. Bryant, 593 Market Street; Washington: L. Fryer, 817 Albee Building; Jacksonville: D. J. Carrison & Co.

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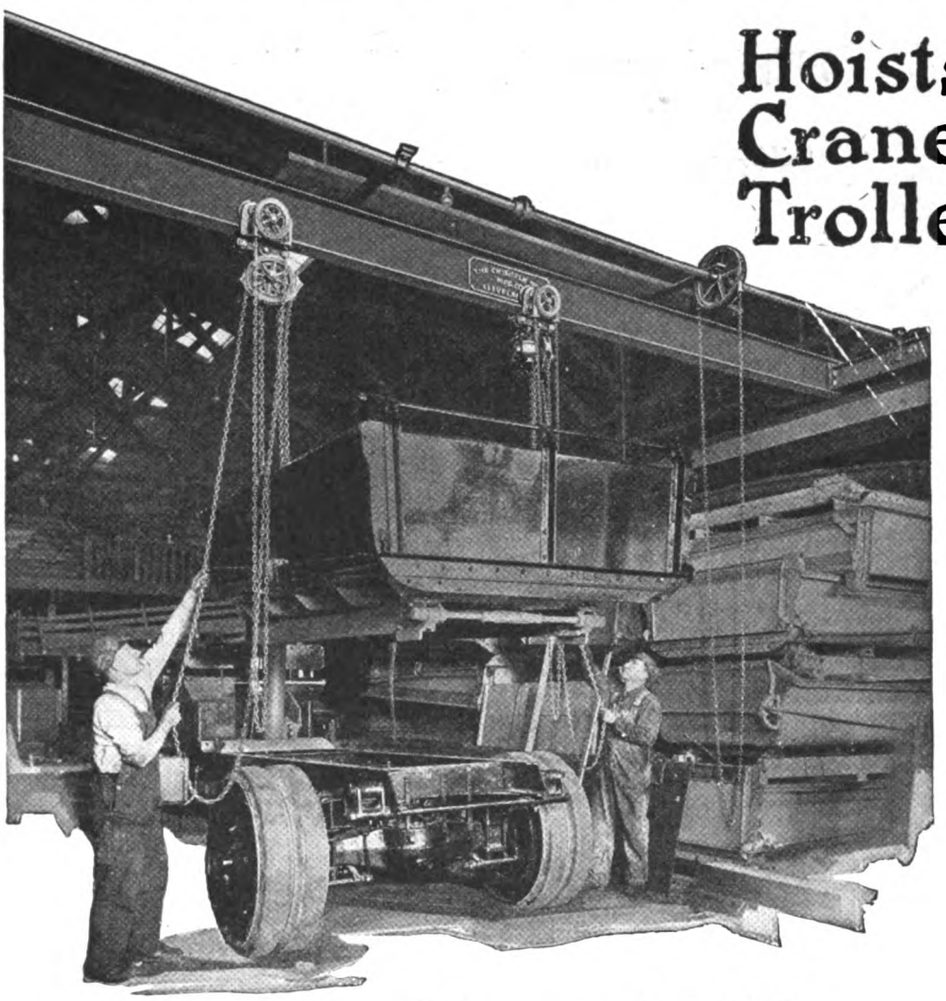
Chisholm-Moore



Hoists
Cranes
Trolleys

Only Two Men on the Job

CAN you possibly imagine two men handling this heavy unwieldy truck body unaided? Yet it's easy for them with this "C-M" outfit. Give your plant the "once over" and see if you can't make similar savings.

Unless yours is an unusual plant, there are probably places where you could speed up the work or cut the cost with "C-M" appliances. The janitor of an apartment house uses a "Cyclone" Hoist to lift the ash cans out of the basement, while the U. S. Navy uses the same type hoist to feed ammunition to the big guns.

"Cyclone" Hoists from ¼ ton to 40 ton — Cranes, from the simple Jib Crane up to the large traveling Crane-Trolleys, in almost any capacity,— these are all included in the "C-M" line.

The "C-M" Catalog, showing many labor-saving installations, as well as the complete line of "C-M" equipment will be sent on request.

THE CHISHOLM-MOORE MFG. CO., Cleveland, O.

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Two Graving Docks
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WORLD WIDE WIRELESS

IN addition to the complete line of Radio Transmitting and Receiving sets sold by the RADIO CORPORATION OF AMERICA, for Ship to Ship and Ship to Shore Communication, the Corporation is in a position to quote upon:

PORTABLE MULE PACK AND CART RADIO SETS.

SPECIAL TYPES OF SPARK TRANSMITTERS FROM 1 TO 20 KILOWATTS, FOR MOBILE AND FIXED STATIONS FOR COMMERCIAL AND GOVERNMENT USE.

MILITARY TRACTOR SETS OF THE VACUUM-TUBE TYPE.

SPECIAL CONTINUOUS WAVE TRANSMITTERS FOR SUBMARINES, DESTROYERS, SEAPLANES AND FOR NAVAL BASES.

SPECIAL INTER-FLEET RADIO TELEPHONE SYSTEMS FOR BATTLESHIPS AND OTHER NAVAL CRAFT.

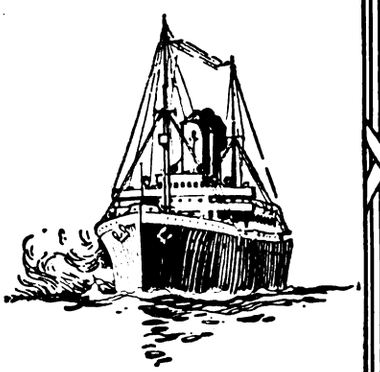
The Corporation has in development a new series of Continuous Wave Tube Transmitters for the various fields of commercial usage. This apparatus bears the stamp of The General Electric Co., (U.S.A.) one of the world's largest electrical manufacturers.

TRANS-OCEANIC RADIO

Two hundred kilowatt radio frequency alternators are now in daily use in the Corporation's high-power trans-oceanic stations. The Corporation is in a position to bid on similar equipment for international communication.

WORLD WIDE WIRELESS

SHIP-WIRELESS may be bought outright, may be leased, and may be bought or leased in addition to our service of inspection, maintenance and operation. We provide licensed, skillful and trustworthy operators. Also our service and inspection depots are located at all important seaports of the world.



Our Nearest Office Will Give You All Details and Information

RADIO CORPORATION OF AMERICA

EDWARD J. NALLY, President

WOOLWORTH BUILDING NEW YORK CITY

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W. & A. FLETCHER CO.

12th to 14th Street, HOBOKEN, N. J., U. S. A.

Telephone 312 Hoboken

New Dry Dock Now In Operation

Length on keel blocks, 440′ 0″.
Lifting capacity, 8500 Tons.

Marine Engineers and Ship Repairers

Contractors for Complete Vessels

Builders of Parsons' Turbines, Engines, Boilers and the Propelling Machinery for over 300 ships.

Large work completed in 1920:

Rebuilding and Refitting S. S. Kroonland, S. S. Finland, S. S. Minnesota, Ferry Boat Chatham, Mr. J. P. Morgan's S. Y. Corsair.

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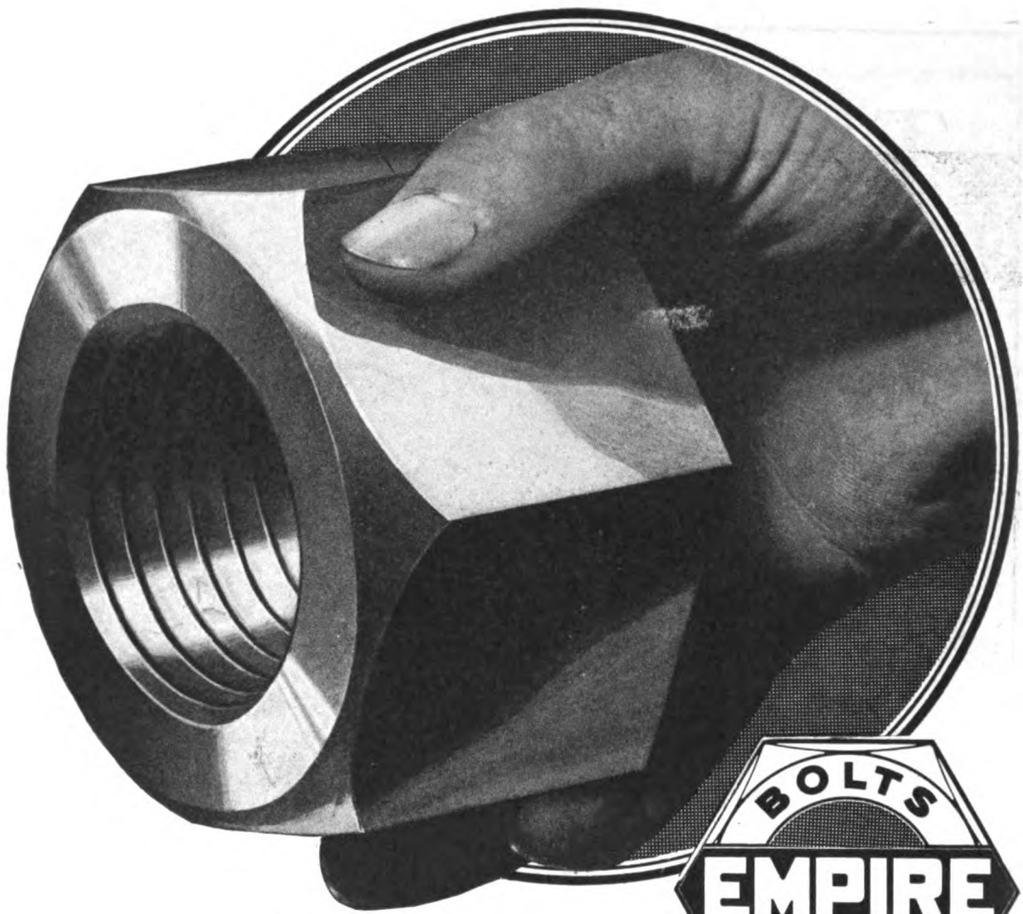

THEY HAVE TO MAKE GOOD

BOLTS and nuts do more than hold the assembled parts together.

They make up the sum total of difference, often enough, between good will and bad. For a bolt or nut that makes trouble on an otherwise high grade assembly is as likely as not to bring adverse judgment on the whole vessel. YOU can offer no excuse for a part that went wrong.

And you won't need to, if the bolts and nuts you use are trade-marked EMPIRE.

Behind the skill and efficiency that insure microscopic limits of accuracy, enduring strength —thoroughgoing quality—are three-quarters of a century of fruitful experience in the manufacture of Empire products.

These are the highest grade bolts and nuts in the world, in every sense of the term—fully guaranteed as to quality of material and workmanship. In no way can you get fuller assurance of uniform dependability than by specifying Empire.

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY

PEMBERWICK, CONN. **PORT CHESTER, NEW YORK** ROCK FALLS, ILLINOIS

Makers of Bolts, Nuts and Rivets Since 1845

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BUILT RUGGED TO WEATHER HARD USE

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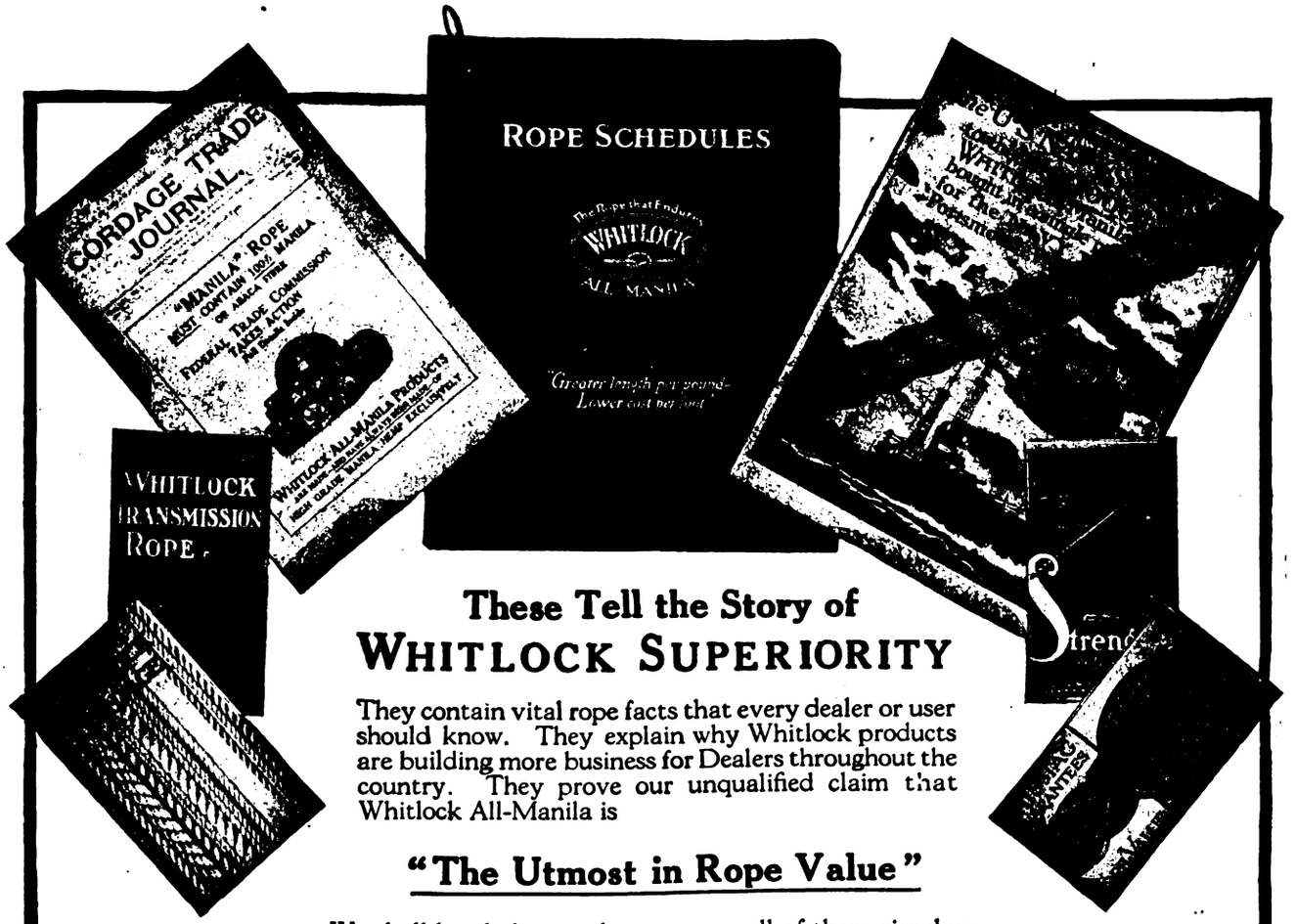

These Tell the Story of
WHITLOCK SUPERIORITY

They contain vital rope facts that every dealer or user should know. They explain why Whitlock products are building more business for Dealers throughout the country. They prove our unqualified claim that Whitlock All-Manila is

"The Utmost in Rope Value"

We shall be glad to mail you any or all of these circulars.
A brief description of each follows, beginning with the lower left-hand picture.

A—This sixteen-page book, "Whitlock Cordage," tells briefly just how carefully Whitlock products are made. It introduces to you each principal kind of rope and explains graphically each step in manufacture from raw fibre to finished coil. It is illustrated by pictures of our up-to-date factory, rope-making processes, and "close-ups" of the finished product.

B—You learn why "Whitlock Transmission Rope" is unsurpassed for life, durability and minimum of stretch.

C—The Federal Trade Commission induced manufacturers to use the term "Manila" only on rope containing 100% Manila fibre. In this reprint from the *Cordage Trade Journal* you discover why Whitlock All-Manila didn't have to be changed to meet stricter Government requirements. It exceeded them in every respect—quality of fibre, yardage and strength.

D—"Rope Schedules." These tables contain valuable information for everyone interested in high-grade Manila rope. They give sizes, weights, lengths, working and breaking strengths. Also, computations are made for costs per 100 feet of all sizes from 3/16 to 2-5/8 inches in diameter. The schedule is reinforced by heavy covers and waterproofed. A time-saver for dealers, engineers and purchasing agents.

E—During the war, the Navy Department placed with us one of the largest orders ever given for rope (1,400,000 lbs.) and our deliveries greatly exceeded our warranties of superior strength, etc.

F—Engineer's tests tell the truth. Here are the cold, straight figures. Four Manila rope samples were tested. Whitlock All-Manila proved strongest by a wide margin.

G—You are protected by a guarantee when you buy or sell Whitlock Manila rope. This reproduction of our green tag states exactly what the Whitlock guarantee means.

Check the circulars you want; cut off this coupon and mail TO-DAY.

WHITLOCK CORDAGE COMPANY **46 South Street, New York**

The Rope that Endures WHITLOCK ALL-MANILA

A____ D____
B____ E____
C____ F____
G____

Name .....
Address .....
.....
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I. M. E.

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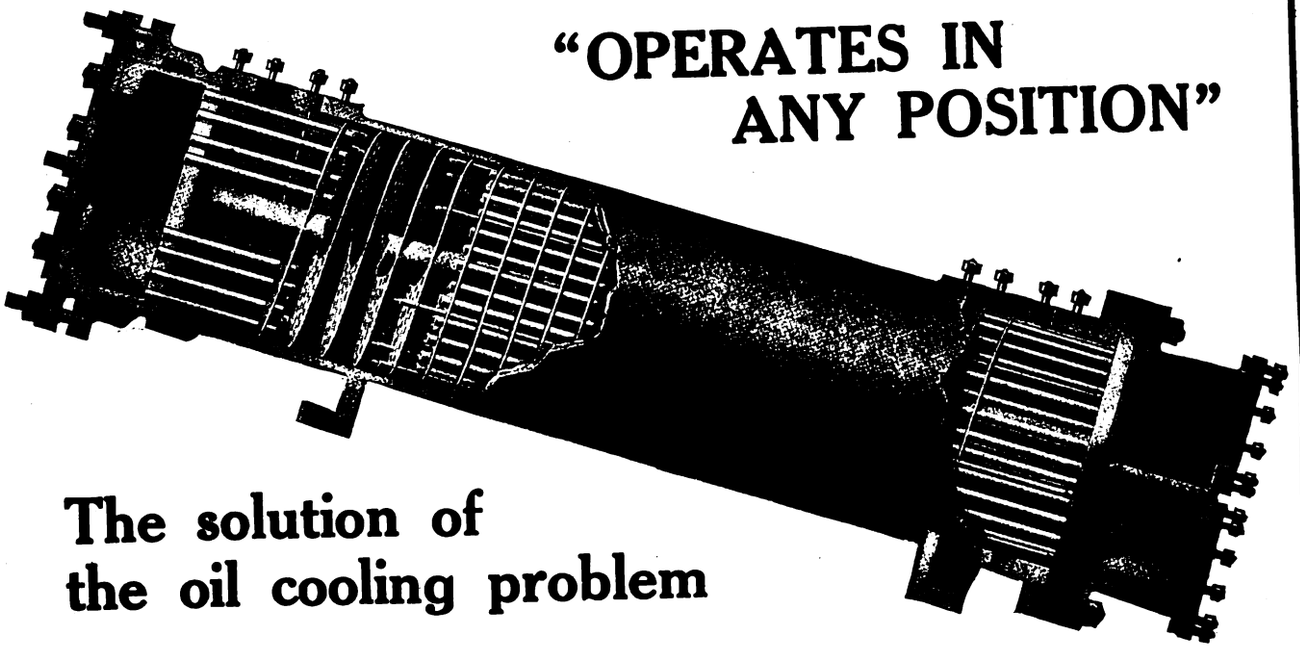

"OPERATES IN ANY POSITION"

The solution of the oil cooling problem

Multiwhirl Cooler

DESIGNED for cooling lubricating oil for turbine bearings, reduction gears etc. With the use of this cooler a constant low temperature of oil can be maintained, insuring maximum efficiency of lubrication and permitting the continued use of the original quantity of oil. Also successfully employed for cooling piston and bearing oils in Diesel Engines.

Oil in shell, cooling water in tubes—entire tube bundle removable.

Helical Baffle—long, smooth oil path—minimum pressure drop.

Tubes expanded into tube plates—no sweated joints.

Outside packed floating head—no expansion strains—no internal joints—impossible for water to leak into oil.

Extreme compactness due to high rate of heat transfer.

Send for Bulletin No. 902

The Griscom-Russell Co.

2124 West Street Building, New York

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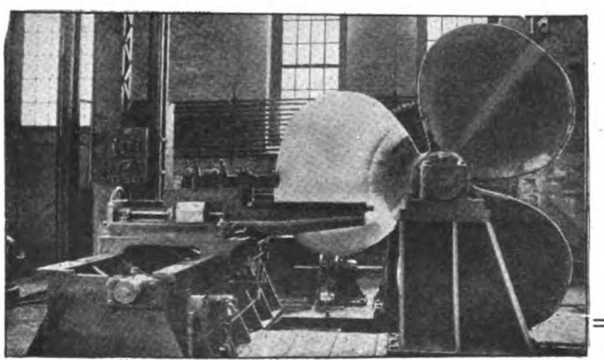
CRAMP



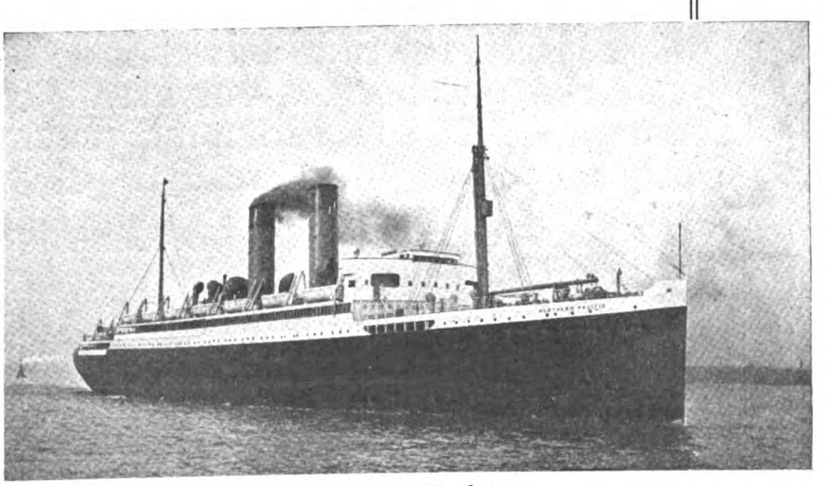
The Glocker Propeller Blade Facing Machine, a special patented machine owned by the Cramp Company and operated only in the Cramp Company's shops.

Cramp Propellers—
CRAMP MACHINED

"Cramp machined" means perfection in propellers —an accuracy of pitch, a true helical driving surface and uniform thickness of blades unobtainable by any other methods. Hundreds of such propellers are made every year by Cramp.

The William Cramp & Sons Ship & Engine Building Co.

Philadelphia



The propellers on the Great Northern are the famous Cramp machined type — perfect driving surfaces, absolutely smooth and every blade of specified thickness at all points as designed.

S. S. Great Northern

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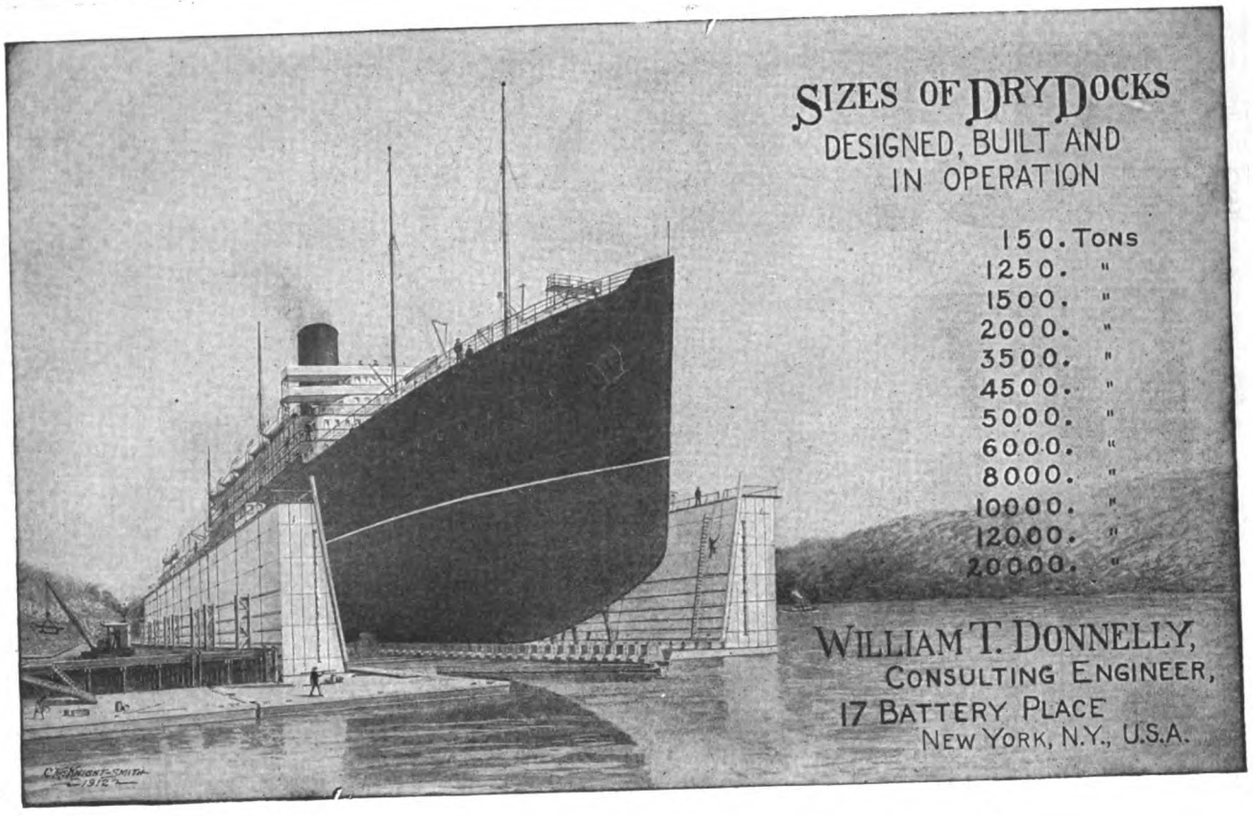

20,000 TON FLOATING DRY DOCK DESIGNED FOR THE BETHLEHEM SHIPBUILDING CORPORATION, AT SPARROWS POINT, MARYLAND. NOW IN COMMISSION AND HIGHLY SUCCESSFUL.

Now under construction two additional dry docks for the above Company.

10,000 TON FLOATING DRY DOCK, DESIGNED FOR ALABAMA DRY DOCK AND SHIPBUILDING COMPANY. NOW AT WORK.

10,000 TON FLOATING DRY DOCK, DESIGNED FOR JAHNCKE DRY DOCK & SHIP REPAIR COMPANY, NEW ORLEANS, LA. NOW PROVIDING SERVICE FOR SHIPS.

10,000 TON FLOATING DRY DOCK, DESIGNED FOR GALVESTON DRY DOCK AND CONSTRUCTION COMPANY, GALVESTON, TEXAS. NOW IN OPERATION.

Designer of Floating Dry Docks, Steel, Wood, or Steel and Wood Construction. Pontoon Types, Sectional Type, Box Docks.

Plans on hand for sizes from 1,000 tons to 20,000 tons lifting capacity.

For plans and specifications apply
WILLIAM T. DONNELLY
Naval Architect and Marine Engineer
17 Battery Place
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Cable Address: "Nellydon" all codes.

Ship Repair and Shipbuilding Plants. Reinforced Concrete Pier Construction. Harbor Improvements.

Plans and specifications and superintendence of construction.

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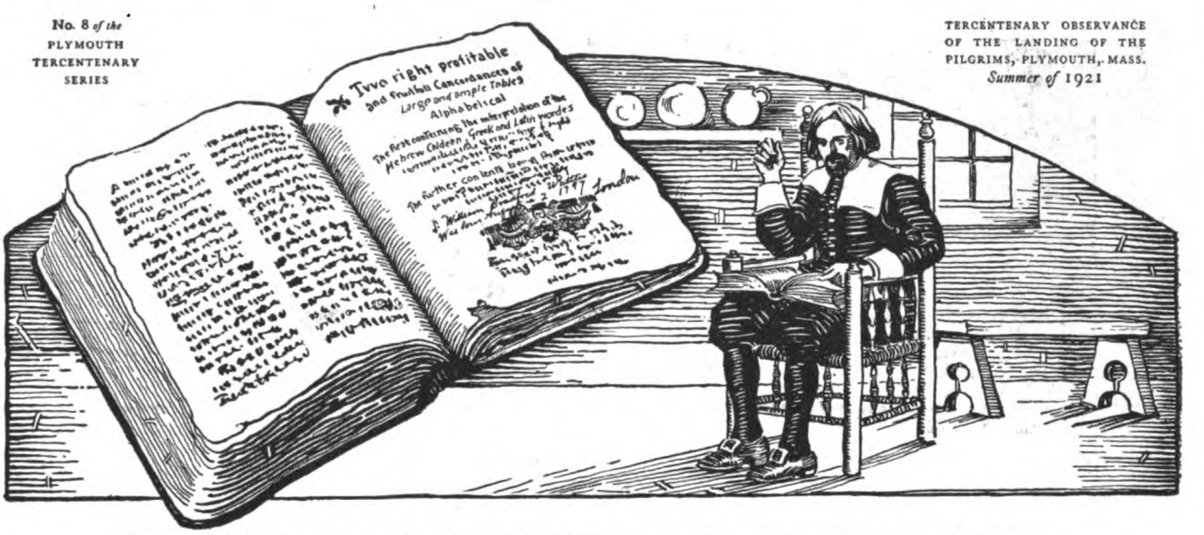
No. 8 *of the* PLYMOUTH TERCENTENARY SERIES

TERCENTENARY OBSERVANCE OF THE LANDING OF THE PILGRIMS, PLYMOUTH, MASS. *Summer of* 1921



Ye BIBLE of GOVERNOR BRADFORD

GOVERNOR BRADFORD'S Bible may be seen in its case in Pilgrim Hall by those who visit Plymouth, a mute reminder of the abiding faith of the founders of America.

Heretics they were called in their time, and Separatists, because they insisted that within the covers of this inspired book were to be found the basic principles for civic as well as religious life.

Finding a home in the wilderness, far from friends and in constant danger from starvation, their numbers decimated by sickness, they established the first real democratic government.

Here these few earnest Pilgrims proved to the world that "government of the people and by the people" was a present-day possibility.

* * * *

You are cordially invited by The Plymouth Cordage Hospitality Club to visit the scenes of the Plymouth Republic of 1921. Membership in this Club is open to rope users, whether or not they expect to visit Plymouth. The advantages of this membership are many and will be fully explained by the

PLYMOUTH CORDAGE HOSPITALITY CLUB
OF
THE PLYMOUTH CORDAGE COMPANY
NORTH PLYMOUTH, MASS.

5-1

PLYMOUTH - the town of the Pilgrims
the Home of the Rope You Can Trust

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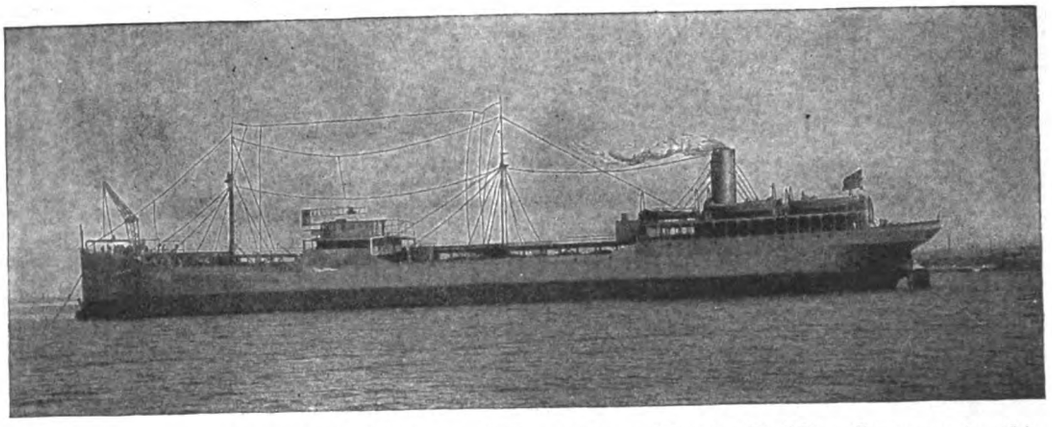


S. S. Kaweah, oil tanker built by W. Cramp & Sons Ship and Engine Building Company for the Emergency Fleet Corporation Equipped with Clothel Refrigeration.

Cooled by a Chemical Unequalled for Marine Refrigeration

Ethyl-Chloride, the cooling agent of Clothel Marine Refrigerating Systems, is the most stable refrigerant in use.

It liquifies at low pressure, reducing to a minimum machine wear and loss from leakage. Danger from bursting strains is absolutely eliminated.

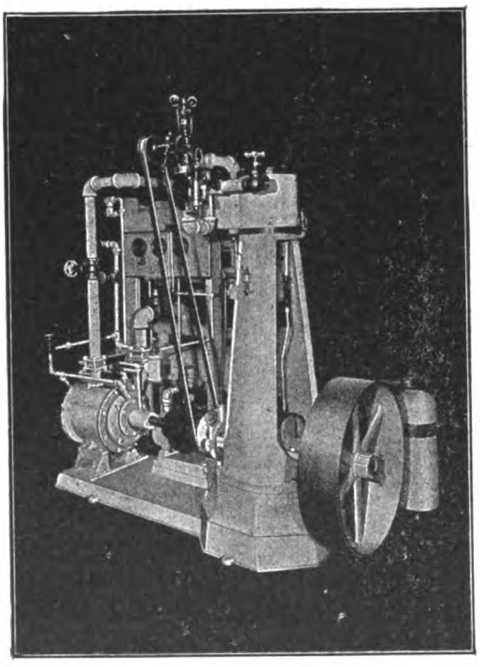
Accidental contact with air or water effects no chemical change.

Ethyl-Chloride is safe to handle, for its vapor is neither harmful nor obnoxious.

It never forms permanent gases in the machine.

It is non-corrosive.

It is economical.



Clothel Refrigeration has been successfully used on tankers and other commercial boats for a number of years. In fact, the manufacturers have been identified with successful refrigeration ever since the manufacture of ice became commercially practical.

The Clothel Refrigerating Company

61 Broadway, New York City

17 St. John St., Montreal, Canada

REPRESENTATIVES

Pacific Coast—Ford & Geirrine, San Francisco
China—J. P. Sartz, Shanghai
Europe—Captain Paul Koster, Paris
France—Sautier-Harle Co., Paris
Scandinavia and Finland—Sunde & Co., Christiania

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BRUBAKER

Just a "Tap" But A "Just Tap"

You'll know that by the number of holes it taps per tap

THE TAP WITH THE CONTINUOUS TAPER

A METHOD BY WHICH YOU CAN'T TELL WHERE THE TAPER THREAD ENTERS THE STRAIGHT THREAD, THEREBY PRODUCING A UNIFORM CUTTING EDGE WHICH DISTRIBUTES THE WORK.

W. L. Brubaker & Bros.

50 Church Street, New York

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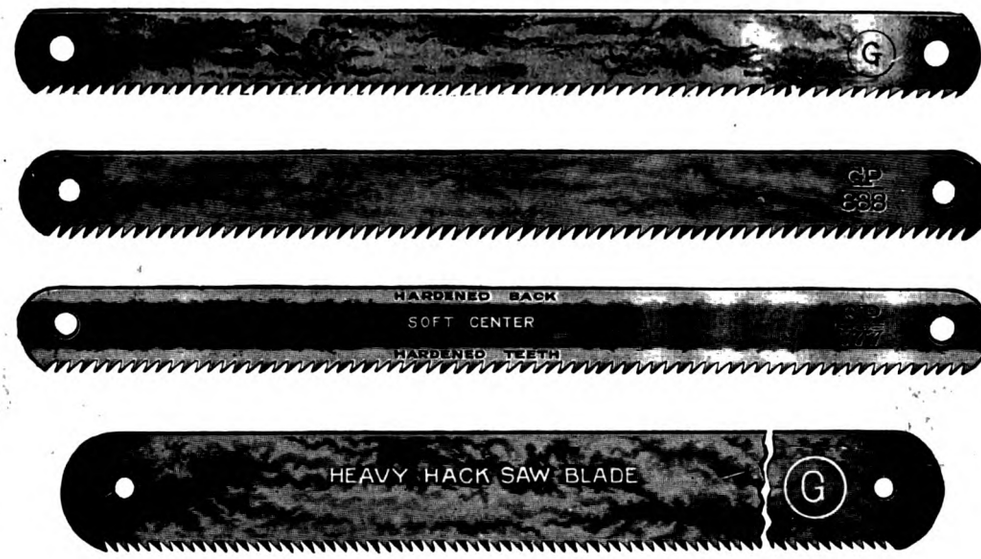
GOODELL-PRATT
1500 GOOD TOOLS



A complete pocket catalog of these and the 1500 other Goodell-Pratt Tools will be sent on request.

Hack-Saw Blades

ONE manufacturing feature that makes Goodell-Pratt Hack-Saw Blades different from any other make is common sense. Common sense consists in making a hack-saw blade that will do useful work—not pass freak tests.

A Different Blade for Every Purpose

Many mechanics who have given Goodell-Pratt Hack-Saw Blades severe service day after day know that Goodell-Pratt Blades have something other blades lack. Whether it is to cut a bar of soft iron or a thin tube of high carbon steel, there is a particular Goodell-Pratt Hack-Saw Blade that will do the work satisfactorily and economically.

Why They Are So Good

Goodell-Pratt Hack-Saw Blades do good work because of the good material, good workmanship and good designing put into them. In this respect they are just like all the other 1500 Goodell-Pratt Tools. Every tool of this large line is made to do useful work, and every one does.

GOODELL-PRATT COMPANY **Greenfield, Mass., U.S.A.**

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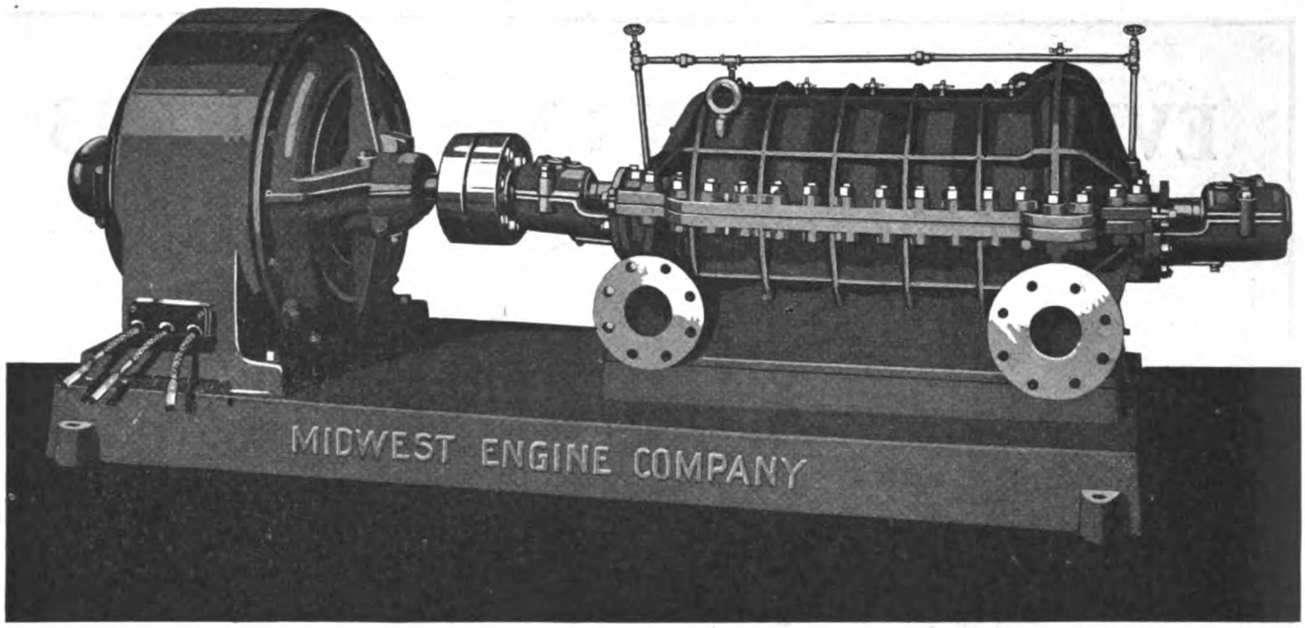

Pumps for Marine Service That Withstand Corrosive Action

Meco Metal—a "Midwest" product which we are now fabricating into pumps—is destined to revolutionize the kind of service you can expect from Marine pumps.

Meco Metal is a non-corrosive metal for marine pumping service that combines the tensile strength of steel with the ductility of brass. It will withstand the corrosive action of salt water as well as the action of all sulphates, including sulphuric acids, diluted or concentrated.

Midwest "Meco Metal" pumps are ideal for feed pumps, circulating pumps, bilge pumps, dry dock pumps, or for any service where the corrosive action of water or air is injurious.

When planning marine equipment let our engineers assist you.

DEPENDABLE POWER

Midwest Engine Company Products

Midwest—Centrifugal, Reciprocating and Deep Well Pumps and Auxiliaries
Midwest—Utilitor
Midwest—Truck Engines
Midwest—Tractor Engines
Midwest—Wait Turbine (Impulse Type)

Address—Midwest Engine Co., in the following cities:

Birmingham	Houston	Pittsburg
Baltimore	Kansas City	San Francisco
Boston	Los Angeles	Salt Lake City
Cleveland	Little Rock	St. Louis
Chicago	Medicine Hat, Alta.	St. Paul
Denver	New York City	Seattle
El Paso	New Orleans	Tulsa
	Philadelphia	

MIDWEST ENGINE COMPANY
INDIANAPOLIS, U. S. A.

MIDWEST MECO METAL PUMPS

AN IDEAL ACID RESISTING METAL

FOR MINE PUMPS SUBJECT TO CORROSION

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EVERY SEA GOING VESSEL NEEDS

FOR FIRE PROTECTION

Great losses have occurred thru failure of prompt detection and correct location of fires below deck. Of all marine fires in the past six years fully seventy per cent. started delow decks.

THE RICH SYSTEM FOR DETECTING AND EXTINGUISHING MARINE FIRES not only gives immediate and accurate location of fire but also extinguishes it. It uses the steam smothering lines required by Federal Statutes and utilizes the same pipes for detecting purposes.

Adapted to use steam, water, carbon dioxide or any other fire extinguishing gas or vapor.

Full approval of Federal Authorities and recommended and endorsed by Naval Architects, Marine Underwriters, Surveyors and a long list of satisfied ship owners.

Years of actual service have proved its value.

Full particulars furnished by

WALTER KIDDE and COMPANY, Incorporated

90 West Street **New York City**

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"NACO"

Electric

CAST STEEL

ANCHOR CHAIN CABLE

marks the only advancement in the development and manufacture of chain cable which is in keeping with the great progress made in ship building, as represented by the giant steel steamship of today compared with the wooden ships of a few years ago.

"Naco" Steel Anchor Chain is manufactured by methods which guarantee the uniformity of dimensions and shape of links, which is essential for smooth running of the chain over the wild cat.

The link and stud being one solid piece, all chance for the stud to work loose and fall out is eliminated, and the reliability of the chain greatly increased.

The material is specially heat treated electric cast steel of very much higher tensile strength than ordinary chain iron.

Specify "Naco" Anchor Chain Cable.

THE NATIONAL MALLEABLE CASTINGS CO.

CLEVELAND, OHIO

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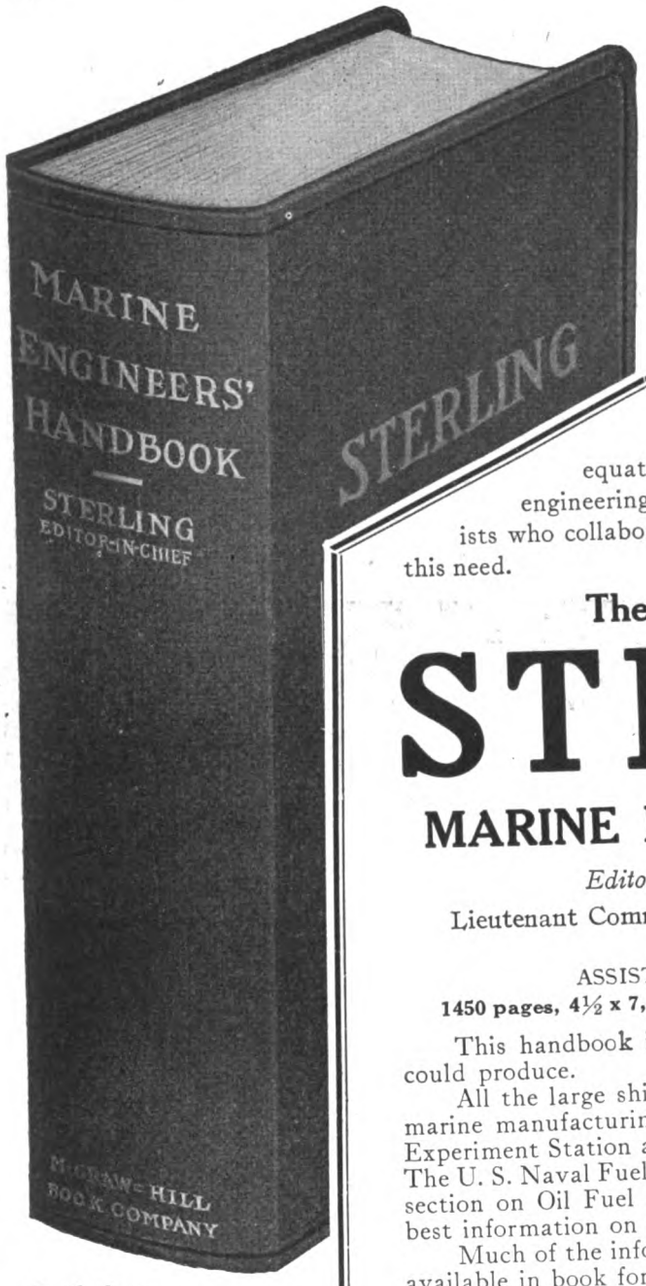

The Big Book on Marine Engineering

Now Ready

Marine engineers have long felt the need of an adequate, modern handbook covering every phase of marine engineering. Commander Sterling, with the thirty other specialists who collaborated with him, has produced the great book to meet this need.

The Work of 30 Specialists

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MARINE ENGINEERS' HANDBOOK

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ASSISTED BY TWENTY-NINE SPECIALISTS

1450 pages, 4½ x 7, flexible **$7.00 net, postpaid**

This handbook is the best book of its kind that brains and money could produce.

All the large shipyards have contributed to this work. Hundreds of marine manufacturing companies have furnished data. The U. S. Naval Experiment Station at Annapolis furnished and checked much test data. The U. S. Naval Fuel Oil Testing Plant has made possible the very complete section on Oil Fuel Burning. In short, this new handbook contains the best information on marine engineering available.

Much of the information in this great handbook has never before been available in book form. The section on Fuel Oil Burning, for instance, is the best treatment of this subject in English. The section on Marine Turbines is also especially noteworthy because of its completeness and modernity.

The book covers thoroughly every important phase of marine engineering for both designing and operating engineers.

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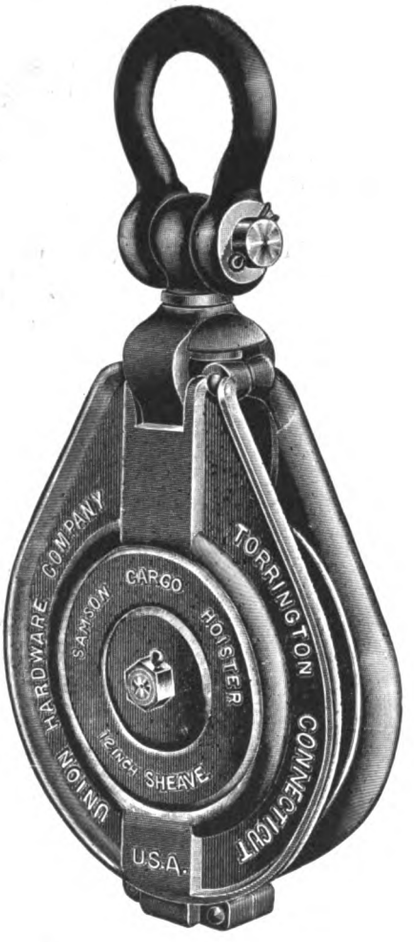
Might Made Right—
The Samson Cargo Hoister



MIGHTY—because rightly built of the right metals—the strongest cargo hoisting block made for heavy, continuous work at all speeds.

Samson is the master hoister because the inherent strength of the steel is reinforced by extra heavy straps and fittings and by extra large sheave pins made of turned machine steel, with nut and cotter.

Samson has drop-forged steel straps; self-lubricating phosphor bronze bushings and side bearings; galvanized sheaves with polished scores.

Sizes: 8, 10, 12, 14 inches for Manila or Wire Rope with or without Beckets

We also manufacture a complete line of wood and steel blocks with all styles of special fittings. Send for NET price list.

UNION HARDWARE COMPANY
TORRINGTON, CONN.
NEW YORK OFFICE - 99 CHAMBERS ST.

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CONDULETS

Utilizing Shore Current for Auxiliaries

TYPE BRHD plug receptacle equipment meets a requirement of marine work, in that it provides a means for easy and quick utilization of shore current for lighting or power purposes aboard vessel while in port or in dry dock.

The equipment is designed to be mounted in 4" conduit, and can be installed equally well on wharf, dry dock or vessel.

Send for Condulet catalog showing complete lines of Marine Condulets.

CROUSE-HINDS COMPANY
SYRACUSE, N. Y.
BOSTON NEW YORK CHICAGO
Condulets Panelboards
Knife Switches Floodlights
Guy Anchors
1604

Condulet the Job

CROUSE-HINDS

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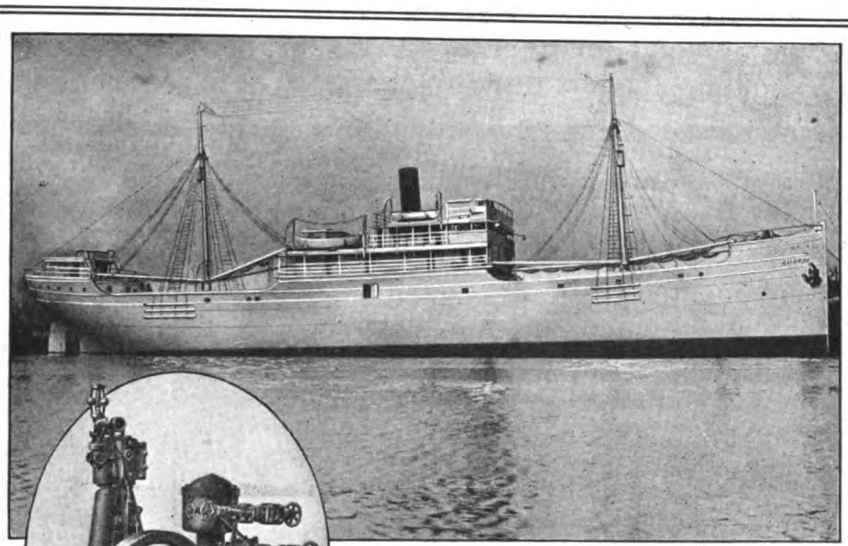

FRICK
Refrigerating Machinery for

Cargo Ships and Provision Storage is built to secure the maximum efficiency and economy with minimum attention and repairs.

Specify FRICK Equipment.

CO^2 **Compression, Ammonia Compression** and **Ammonia Absorption Refrigerating Units in any size** to suit requirements. The **quality, Efficiency** and **Durability** of **Frick Refrigerating Machinery** are big factors of safety.

WRITE FOR PRICES AND DETAILS

BRANCHES:
New York, N. Y. Philadelphia, Pa.
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Frick Company
WAYNESBORO, PA., U. S. A.
ICE MACHINERY SUPERIOR SINCE 1882

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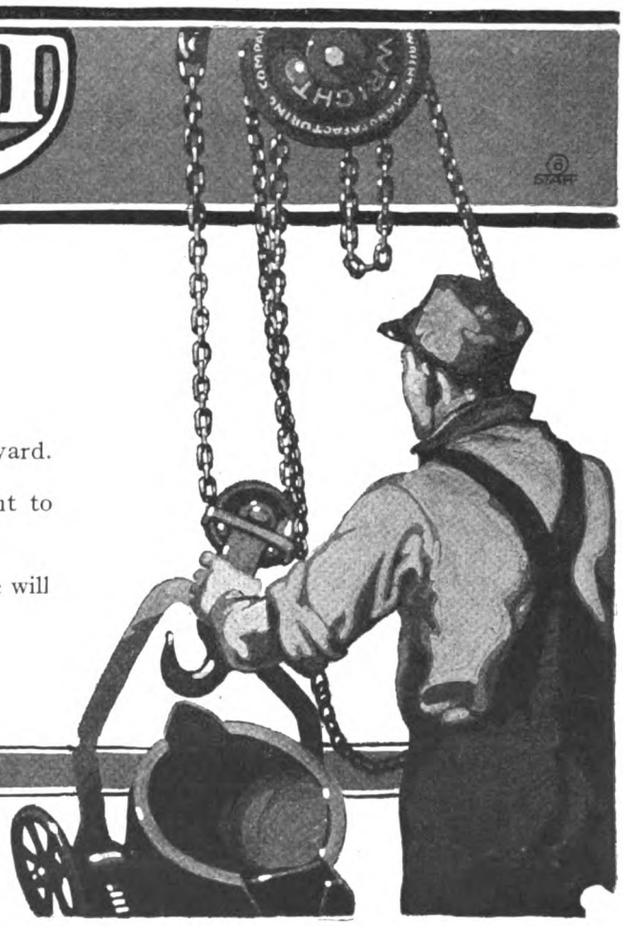
WRIGHT HOIST



Your Men Will Welcome It
Your Production Will Show It
Your Cost Will Prove It

The best hoist for all lifting and shifting in shop and yard.

Easy to operate—safe under over load and convenient to move around.

Just tell us the load range of your requirements and we will send you the proper hoisting equipment.

WRIGHT MANUFACTURING COMPANY
LISBON, OHIO, U. S. A.

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THE LARGEST PLANT IN THE WORLD DEVOTED EXCLUSIVELY TO BUILDING REFRIGERATING AND ICE MAKING MACHINERY

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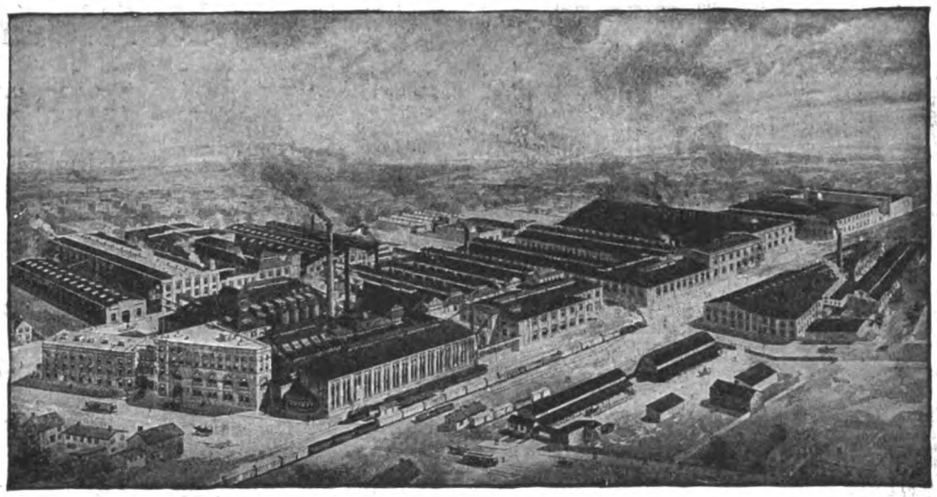

SERVICE

Our plant covers over 16 acres of ground area, in which are manufactured all the parts of complete refrigerating and ice making plants. Over 5,000 men are employed in the manufacture, sale and erection of *YORK PRODUCTS*.

The skill of our experts, in every department, and these extensive manufacturing facilities are at your service. If interested in Mechanical Refrigeration, it will pay you to write us.

YORK MANUFACTURING COMPANY, YORK, PENNA.

Hardie-Tynes Manufacturing Co.

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Birmingham, Ala. U. S. A.

Marine Engines

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Bearings

Heavy Gray Iron and Semi-Steel Castings

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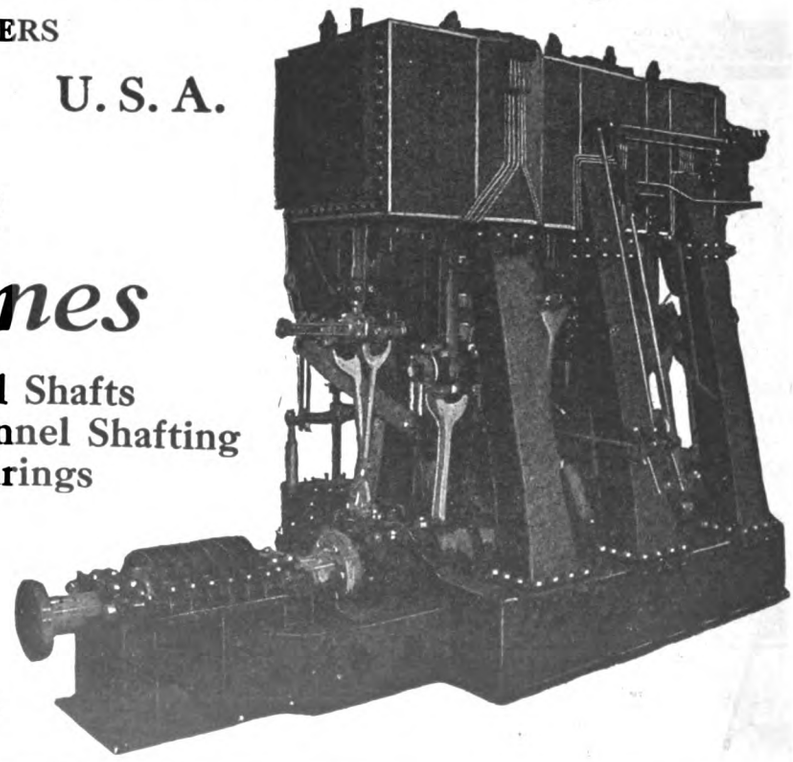

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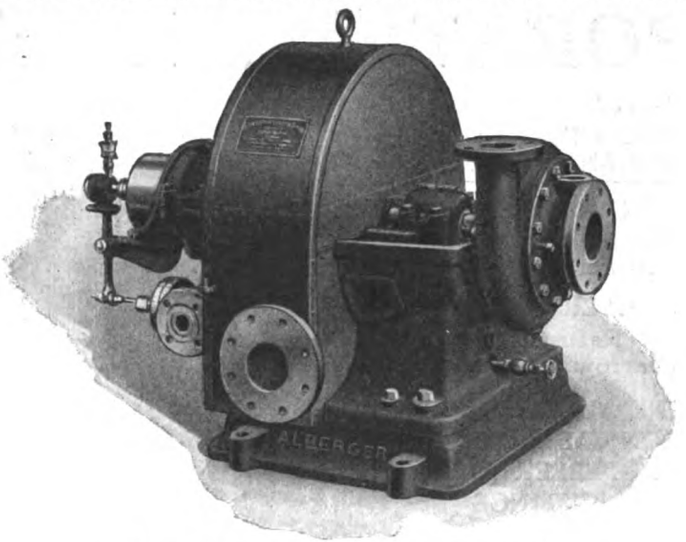
ALBERGER NAVAL TYPE CONDENSATE PUMP

WITH SPECIAL ALBERGER-CURTIS STEAM TURBINE



Pump Catalog Sent on Request

ALBERGER PUMP AND CONDENSER COMPANY

140 CEDAR STREET, NEW YORK, N. Y.

Boston **Philadelphia** **Chicago** **St. Louis**

BUILDERS OF STEAMSHIP ENGINE ROOM AUXILIARIES

THE SHAW ELECTRIC CRANE CO., Works, Muskegon, Mich.

MANNING, MAXWELL & MOORE, Inc., 119 West 40th St., New York

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Builders of
ALL TYPES OF
NAVAL AND MERCHANT VESSELS

MARINE ENGINES
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MARINE BOILERS
Scotch (Cylindrical Return Tube)
Water Tube (Yarrow Type)

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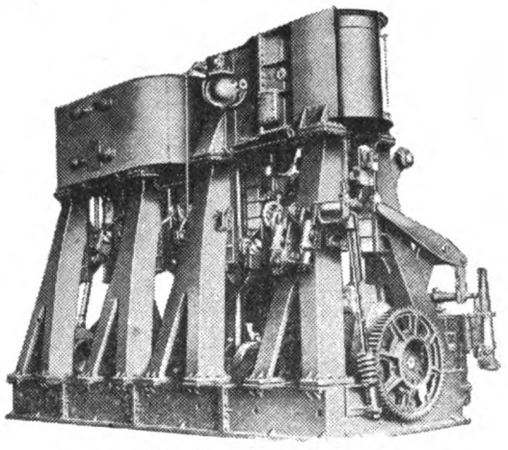
SPECIAL MACHINERY



4-Cylinder Triple Expansion Engine

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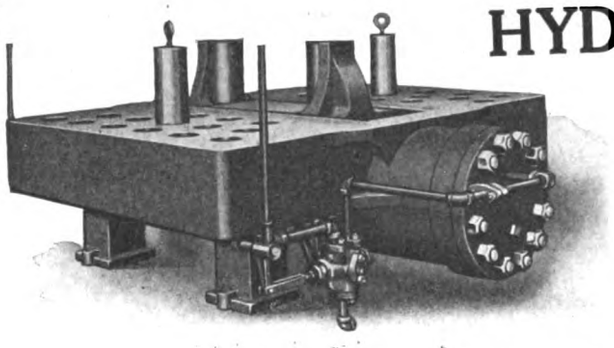

For Bending Pipe, Rods, Shafts, Angles, Beams and Structural Shapes, etc.

We show here *just* one example from our large line of presses for bending and straightening operations

This machine works on a water pressure of 1500 lbs. per square inch. The pins are interchangeable in any of the holes. The ram is double ended and is actuated by two cylinders, enabling the operator to exert force from either side of the table. The valves are placed in one body, and connecting levers at either side of the press govern the movements completely. We build hydraulic presses for every purpose where hydraulic pressure is a possibility—also pumps, accumulators, valves, fittings, packings, shears, riveters, punches, jacks, etc.

Write for Catalog No. 98, Shipbuilding Tools

THE WATSON-STILLMAN CO., ENGINEERS AND BUILDERS OF HYDRAULIC MACHINERY

36 Church St., New York Chicago, McCormick Bldg. Philadelphia, Widener Bldg.

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Marine Electrical Repairs

Ships Re-wired

Dynamo and Motor Repairs

English Type Supplies

Bayonet Lamps and Sockets in Stock

Conlan Electric Corporation

86 Walker St., New York

ESTABLISHED 1905
INCORPORATED 1918

Telephones
Franklin 5337-5338

Armor-Plate

On Account of its Light Weight

When the Goodyear Rubber Co., at Akron, Ohio, needed a shear to do some working on the floor of their shop, they were confronted with the problem of weight.

The big heavy cast iron machines were out of the question.

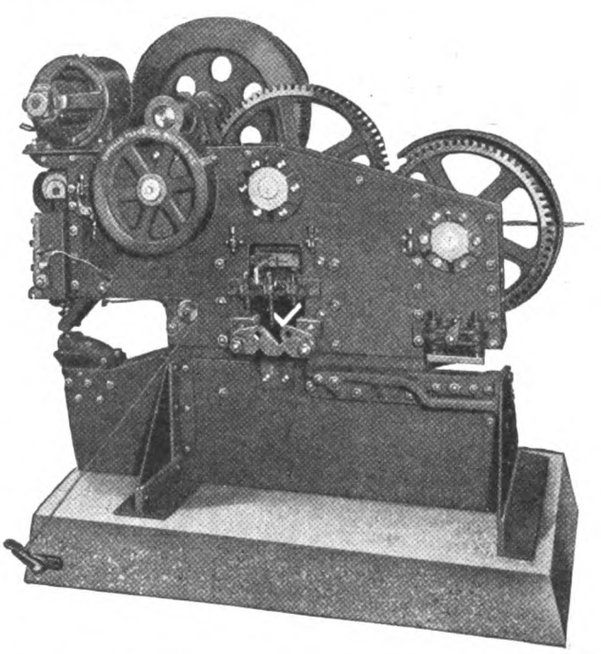
Buffalo solved the problem.

The machine they bought was a Buffalo Armor Plate "Universal".

It did all the work required and weighed only 1-3 as much as a cast iron machine of equal capacity.

Perhaps you have a problem like this—perhaps you can find a **Buffalo machine** to meet your conditions.

Write Dept. 63 for Catalog.



Buffalo Forge Co.
Buffalo, N. Y.

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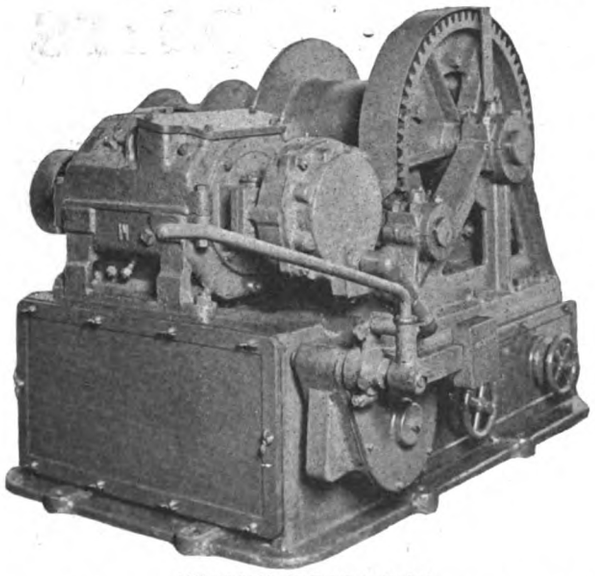
"CUNNINGHAM" QUALITY DECK MACHINERY



ELECTRIC CARGO WINCH
Ruggedly built, Waterproof, Simple, Accessible, and "Fool Proof."

Largest number of Electric Winches installed on American Merchant Ships have been designed and built by **Allan Cunningham Co.** and have been demonstrated superior to all other types in speed and safety in handling cargo, economy in operation and repair costs.

The Electric Winches are designed and built with the same care and thoroughness as the well known **Cunningham** steam machinery and equipment.

They are not experimental but have been demonstrated as satisfactory in five years' service.

CUNNINGHAM STEAM MACHINERY AND EQUIPMENT

Have earned reputation for unequaled satisfaction in service. Early deliveries can be made of either Steam or Electric Equipment.

ALLAN CUNNINGHAM COMPANY, Inc.

Builders of Steam and Electric Winches, Windlasses, Capstans, Steering Gears and Telemotors.

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700 Carleton Ave.,
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YARROW & CO., LTD.

of GLASGOW (Formerly of POPLAR, LONDON)

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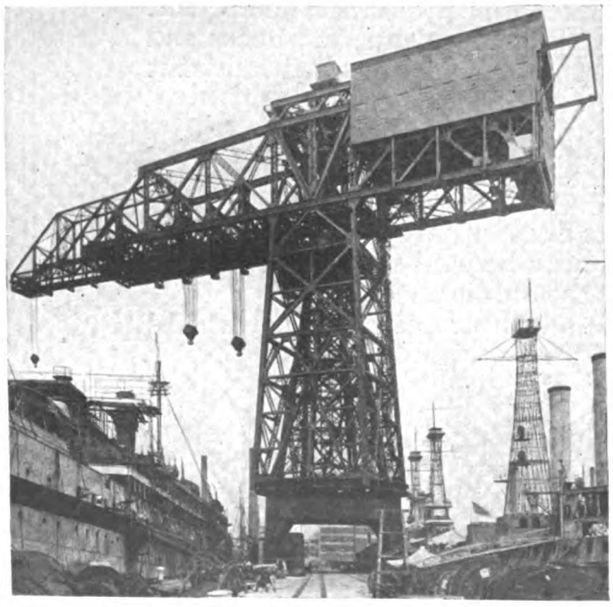

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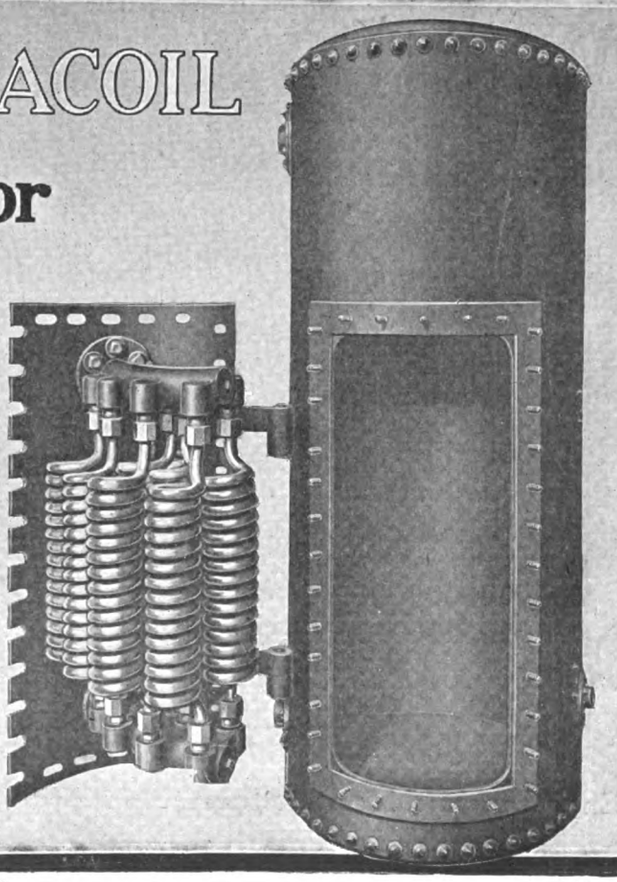

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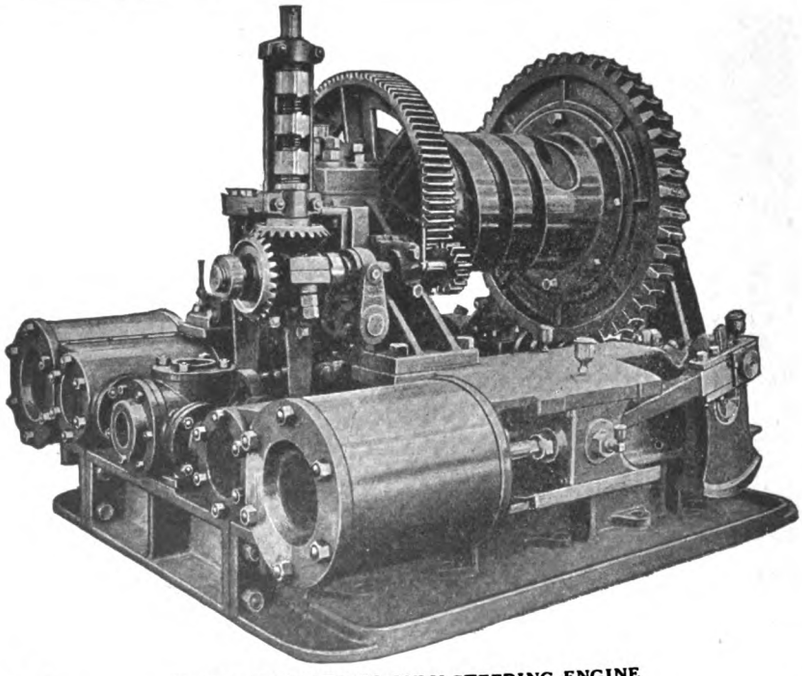

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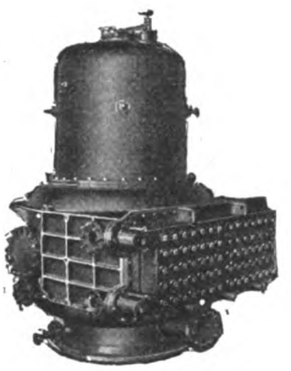

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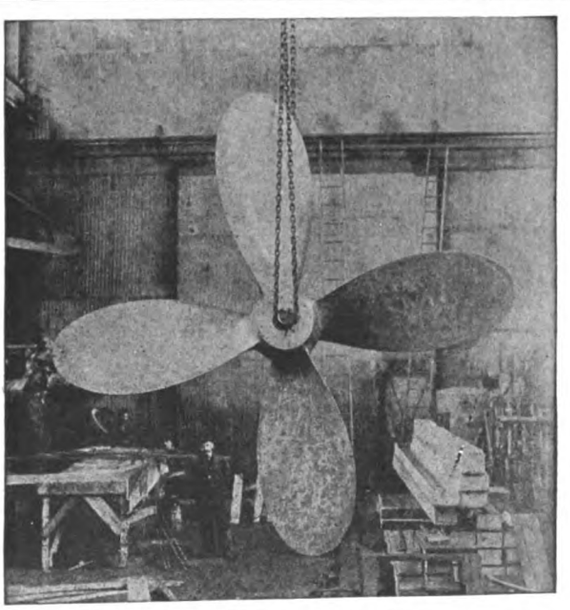

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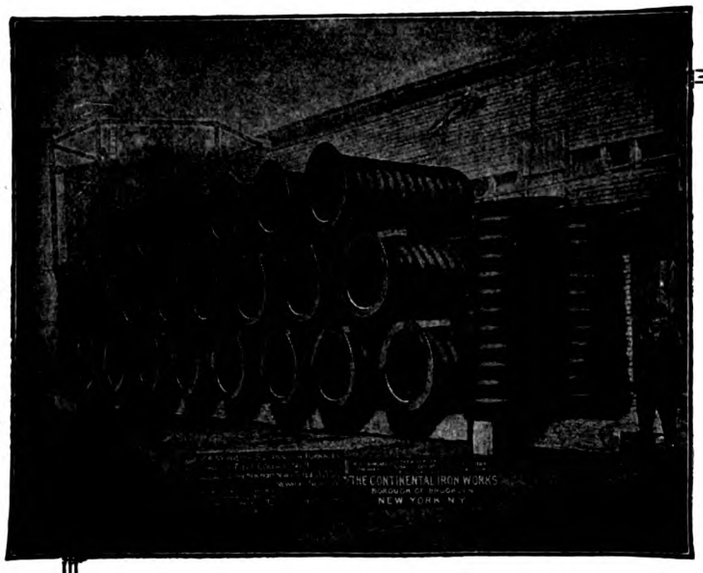

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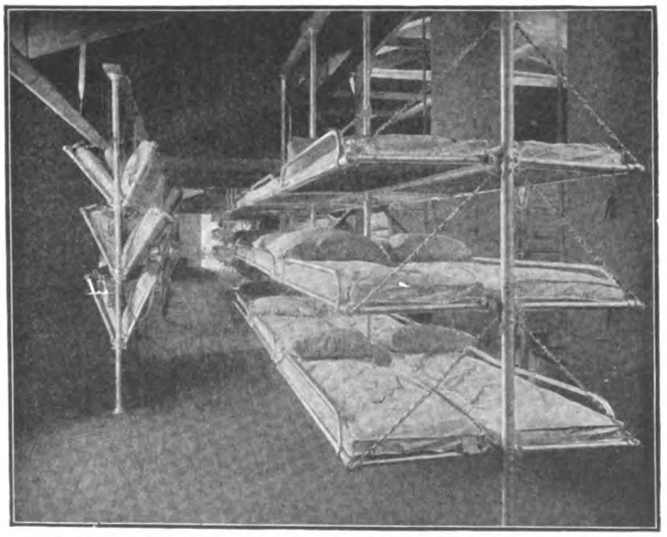

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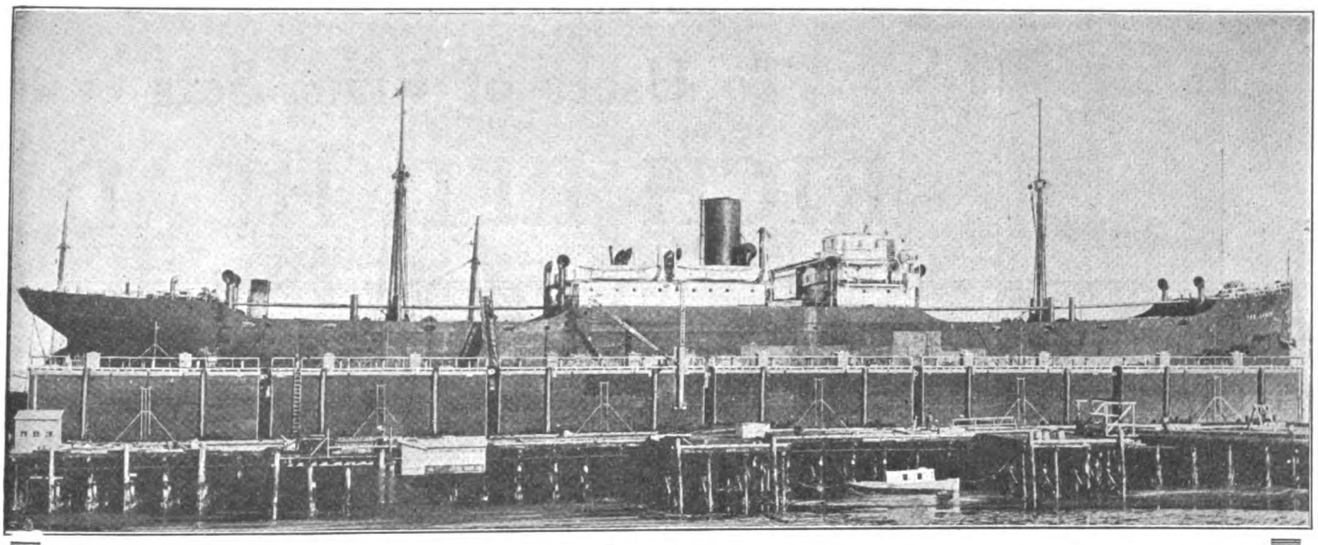

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are made from the same grade of knobbled Charcoal Iron which we have been producing continuously during the past fifty years.

Good Charcoal Iron Tubes will outlast steel tubes, due to their resistance to corrosion and crystallization, and tubes from Parkesburg Charcoal Iron are in service in marine boilers after thirty years' continuous use.

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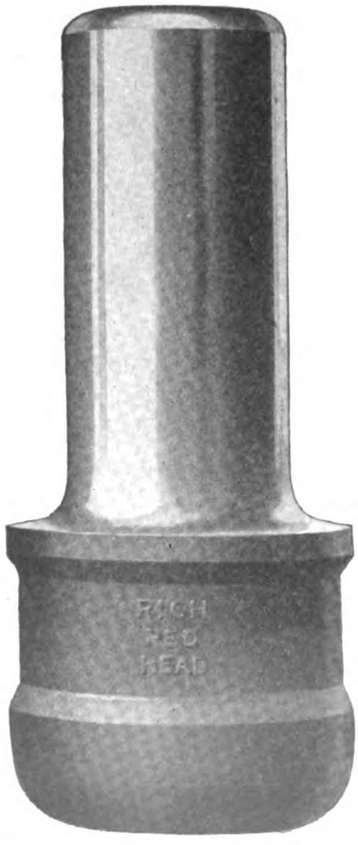

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RIVET SETS

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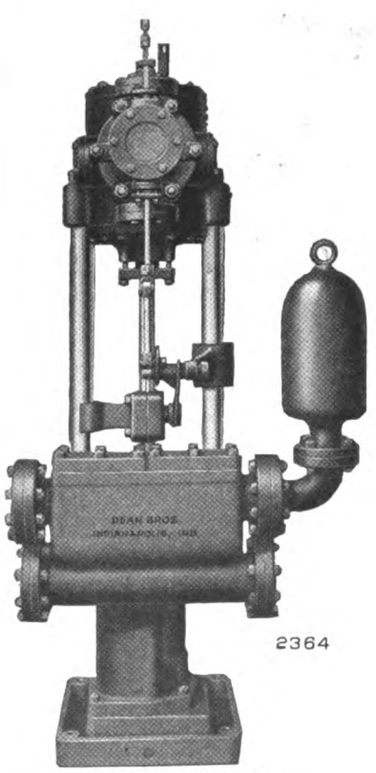

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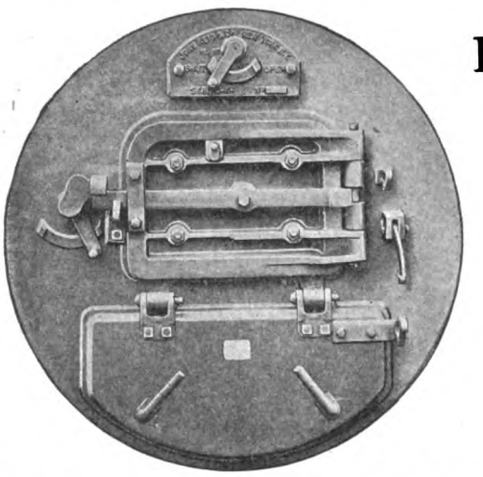

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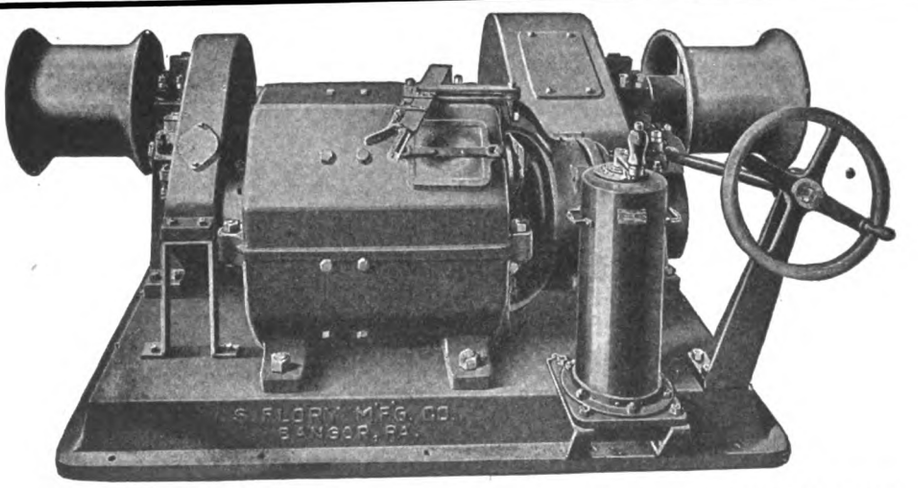

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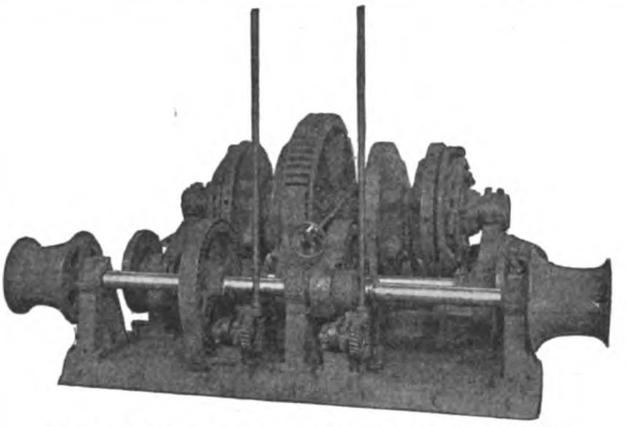

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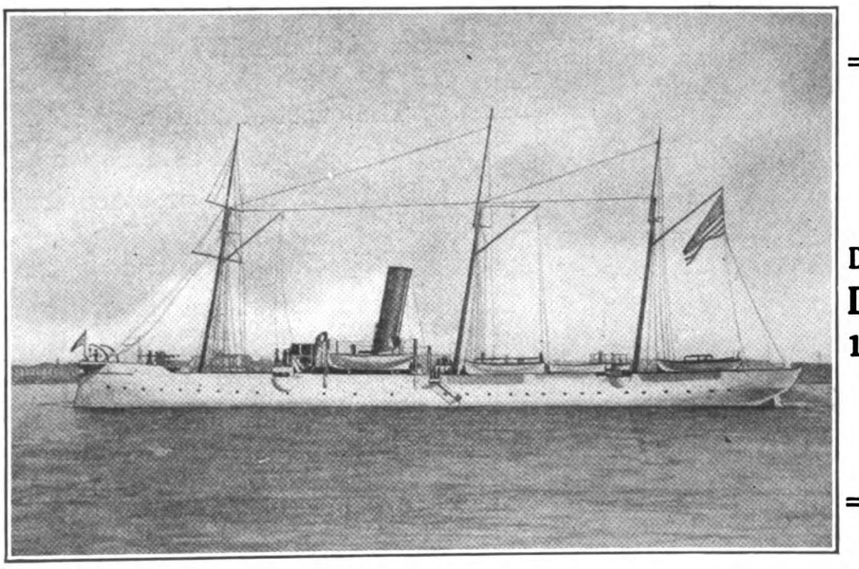

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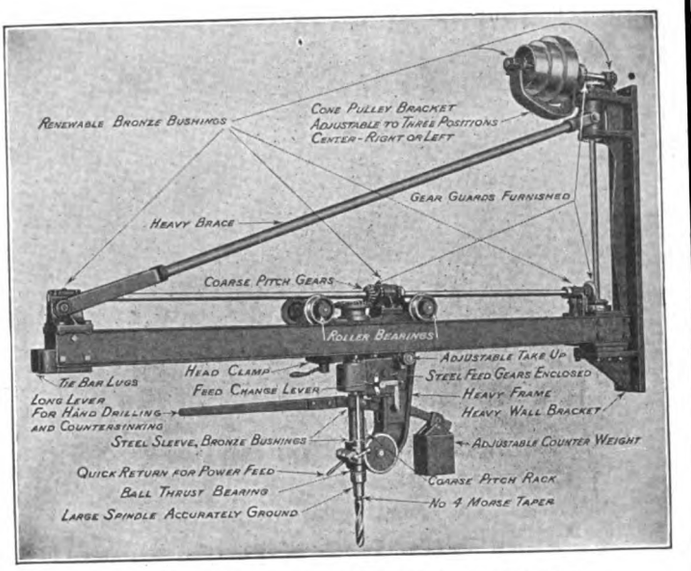

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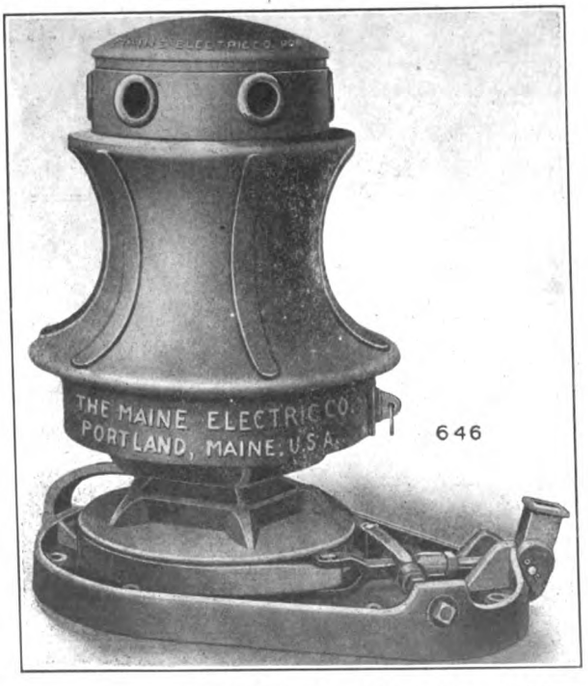
MADE IN FOUR STANDARD SIZES

Rated Size	Drills to center of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

Other Lengths of arm to suit requirements.

"MAINE" HAND OPERATED CAPSTAN - WINDLASS FOR TUGBOATS



This type of windlass gives excellent satisfaction on tugboats and small barges where room is limited.

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We build them to handle any size of chain.

Let us tell you more about them.

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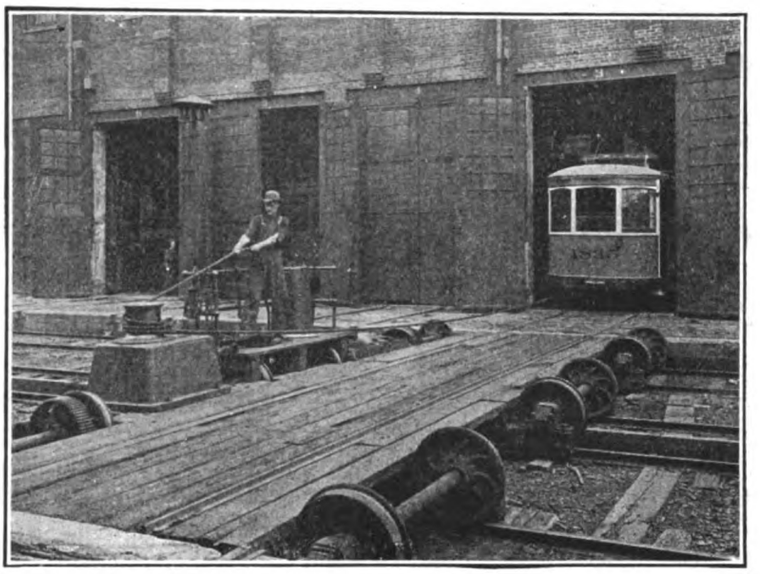

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PIONEERS OF THE INDUSTRY
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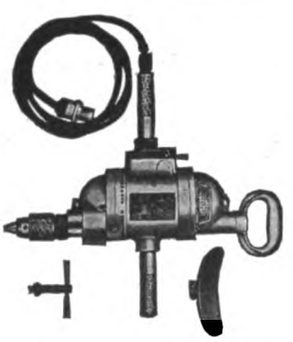
U. S. ELECTRIC DRILLS AND GRINDERS



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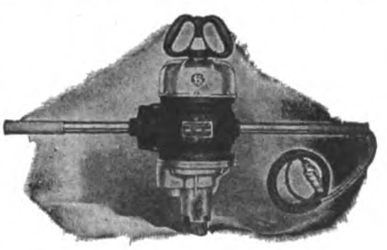

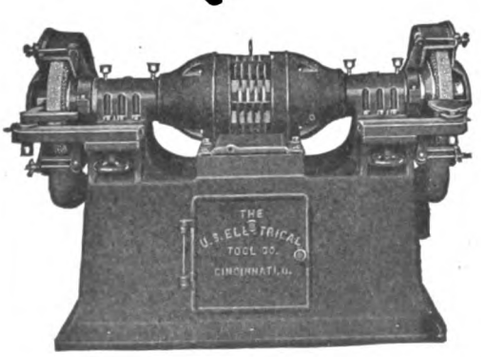

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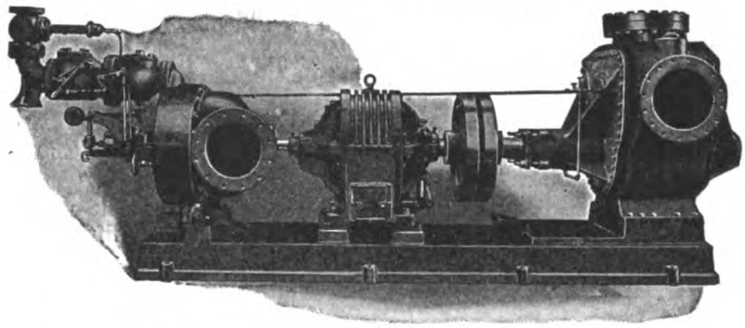
EFFICIENCY

STEAM JACKETED CARGO PUMPS



KINNEY TURBINE DRIVEN, STEAM JACKETED CARGO PUMP, designed for pumping heavy Mexican crude oil, capacity 3000 GPM. These units have been adopted by the Navy Department, Bureau of Steam Engineering and Bureau of Yards and Docks.

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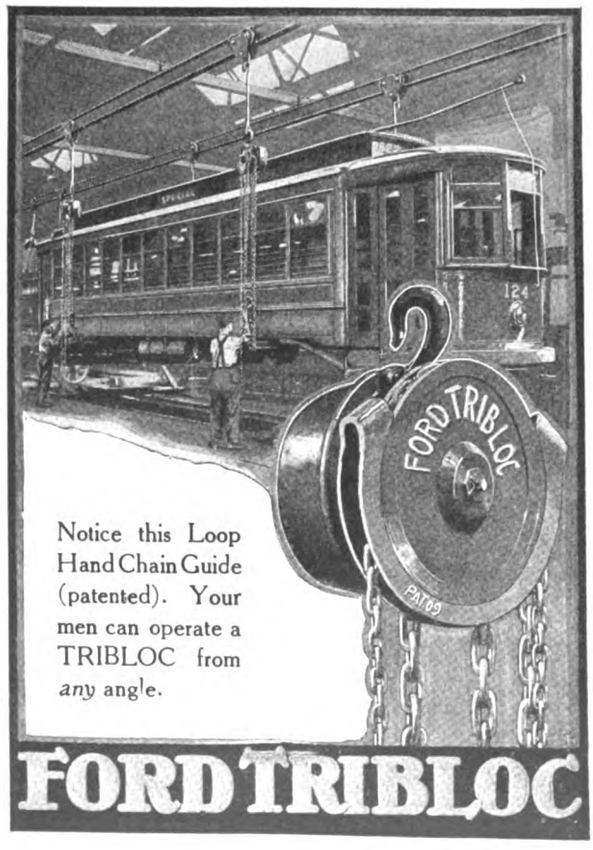

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Men accept the Ford Tribloc as one of their tools. Like wrench or crowbar, it is used when needed, with absolute confidence in its unfailing reliability.

Suspended from roller bearing steel plate trolleys, running on I-beam trackways, each FORD TRIBLOC becomes a mobile lifting and carrying unit, ready for instant use. It consumes no power—it requires no trained operator—it cannot "gag," slip, or give trouble.

Capacities: Half a ton to twenty—and more. Write us.

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Steamer New York	—Central Vermont Railway Co.	3	"
" Clarksburg	—Coastwise Transportation Co.	12	"
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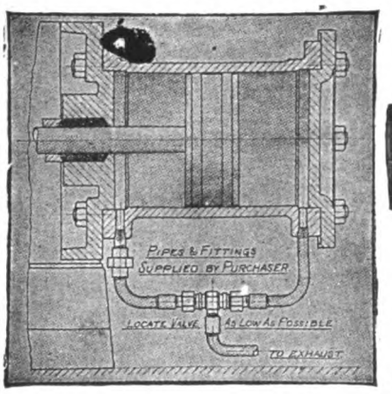
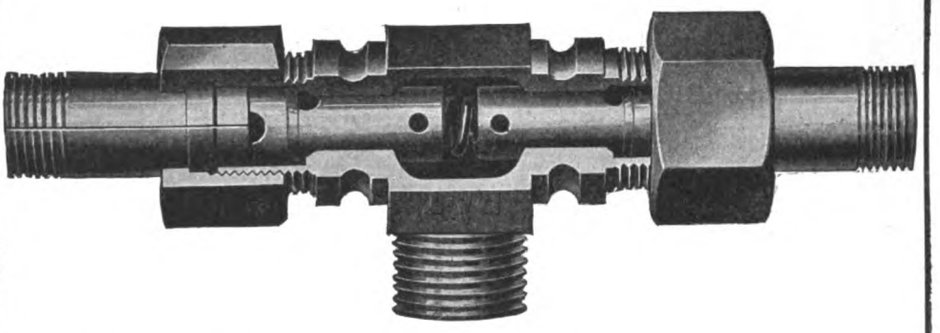
Six Freighters	—Wm. H. Becker, Cleveland, Ohio	12	"

The Dew Automatic Relief Valve for Draining Steam Cylinders





Successfully in use on Auxiliary machinery, on various Steamship Lines and in use in many Stationary Plants.
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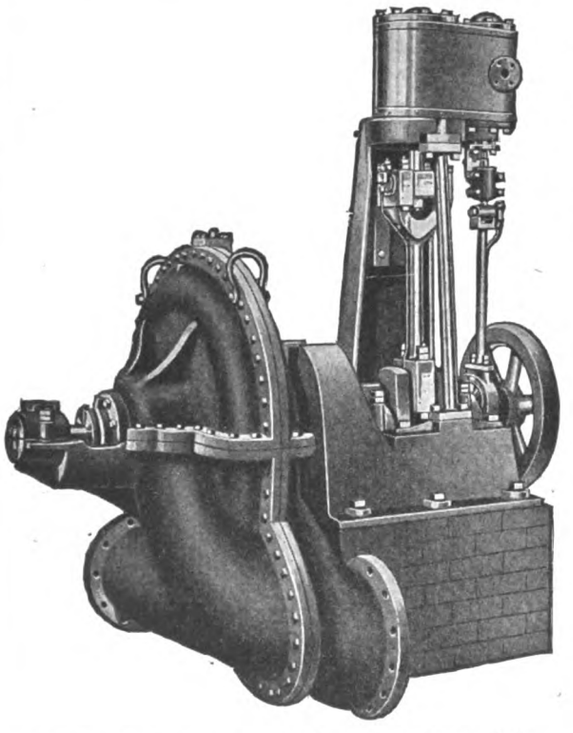

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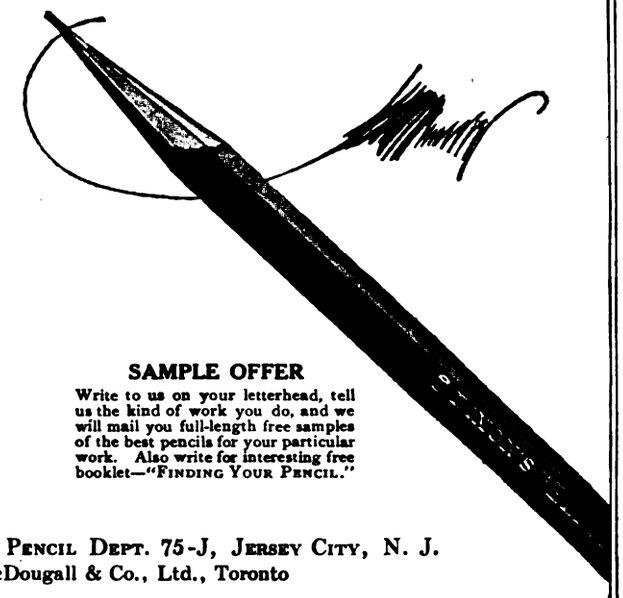

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Write to us on your letterhead, tell us the kind of work you do, and we will mail you full-length free samples of the best pencils for your particular work. Also write for interesting free booklet—"FINDING YOUR PENCIL."

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MOST POWERFUL RIVETING HAMMER ON THE MARKET

The New Cleveland is shorter over all. Hits a harder blow, and uses less aid than any hammer made.

The New Cleveland has a higher speed with less recoil in operation than any riveter on the market.

We can prove it in your work

THE NEW CLEVELAND is made in 15 sizes with Outside or Inside Latch, and is adapted to all classes of work upon which Riveting Hammers can be used.
THE NEW CLEVELAND has a driving range in rivets from ¼-inch to 1½-inches, and is especially adapted for Shipbuilding, Boiler Construction or any riveting where speed and power are required.
IN STOCK: Riveting Hammers, Chipping Hammers, Air Drills for Reaming and Tapping, Breast Drills, Corner Drills, Portable Air Grinders in two sizes, Oscillating Valve Grinders, etc.

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Standard Equipment Everywhere.

Air-tight under all pressures.
Quickly connected or disconnected.

Interchangeable in all sizes from ¼-inch to ¾-inch inclusive.

Shows Cleco Never-Slip Hose Clamps Attached to Bowes Coupling

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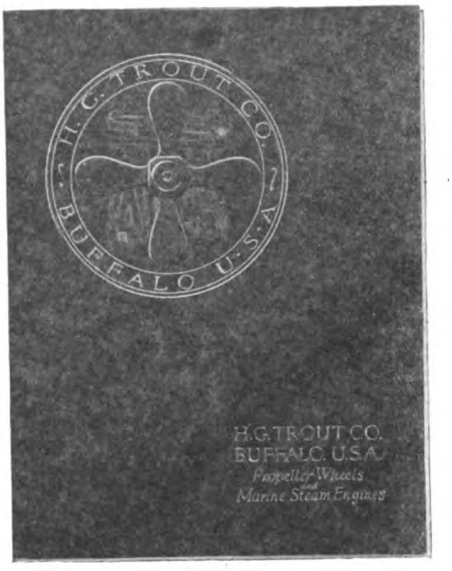
This catalog shows, not only views of our products, but also views of our shops and up to date equipment.



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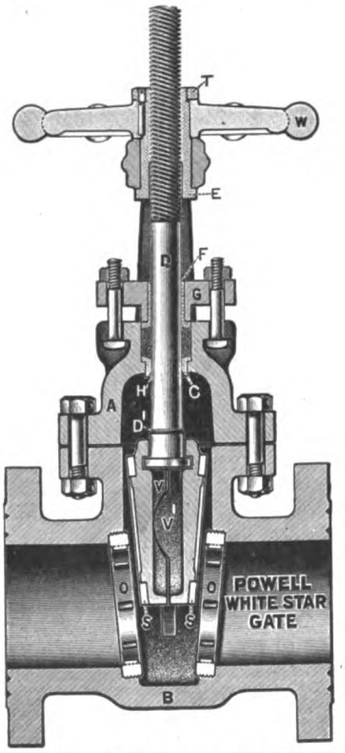

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Outside screw stem and yoke. Screwed or flanged ends. Absolutely dependable for steam, water, gas, air or chemicals. Steam working pressure up to 150 and 250 pounds.

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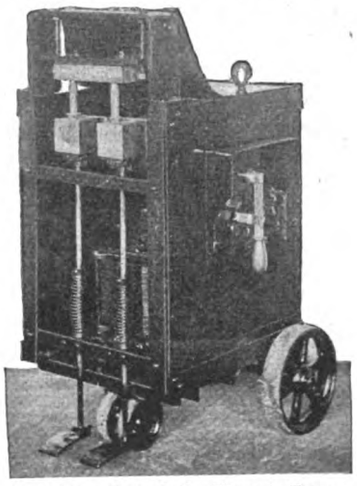
Why you should use U. S. E. Co. Electric Rivet Heaters

1. Production of hot rivets in a few seconds.
2. No loss time in starting forge.
3. Eliminates the breaking and carrying of coke, coal and fuel oil to the forges (as by the old method).
4. Rivets heated from the inside, giving uniformity of heat.
5. Minimum in lost and burnt rivets.
6. Heats the rivets free from scale.
7. Current used only, when heating rivets, giving greater economy.
8. Heats rivets to 6″ in length without adjustment.
9. Forges are air-cooled,—Adjustable, Bridge to take any length Rivet.
10. Clean and cool, no smoke, ashes or gases, less heat radiation.
11. Production of heated rivets, 100 lbs. per K. W. H.
12. The forge is portable, supplied with wheels and eyebolts so that it is easily moved, or carried by crane.
13. Built for service, ABSOLUTELY FOOL PROOF.
14. Control switch so that any size rivet may be heated, regulating the heat as desired.
15. Eliminates upkeep of old style forges.

Equipments are available in all sizes and for all commercial voltages alternating current. Let us estimate on your requirements. Prices upon application.



Model I. Type C. 2. Electric Forge

Industrial and Structural Electric Rivet Heating Forges are manufactured as follows:

Rivets diameter.
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Model S—Type for construction work small and compact. Same type as the Industrial Forge without wheels.

We will be glad to quote prices on any devices for special heating purposes, at any time. Our engineers will help solve your heating problems upon request, for annealing, hardening, welding, blacksmithing.

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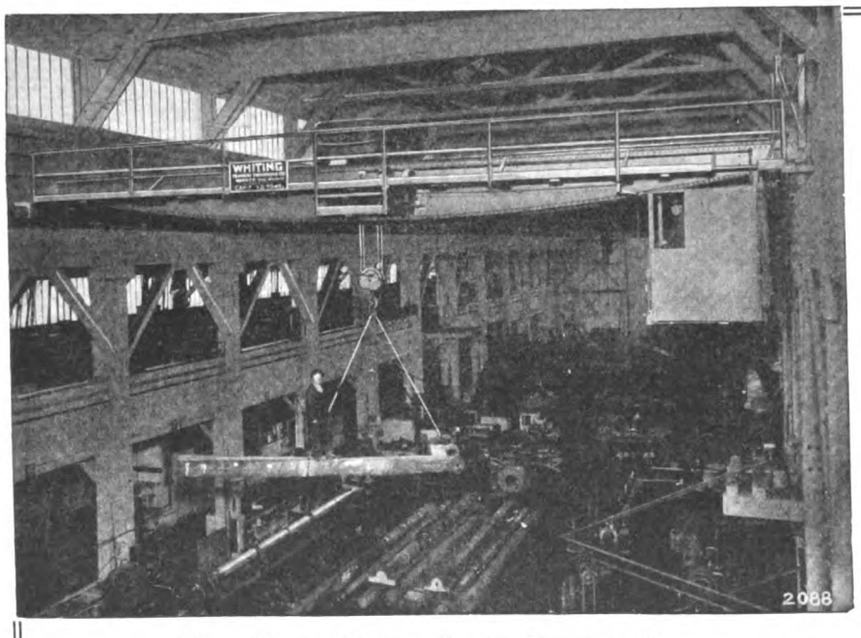
Patented and Manufactured by

THE UNITED STATES ELECTRIC CO., New London, Conn.



Three-Motor Whiting Electric Traveling Crane
Capacity 10 tons, Span 46 ft.
Skinner & Eddy Corporation, Seattle, Wash.

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With over a quarter century's experience in crane building you can depend on Whiting Cranes for efficient reliable service in shipbuilding plants as well as other branches of industry.

All types—1 to 250 tons capacity.

Let us help you on your handling problems.

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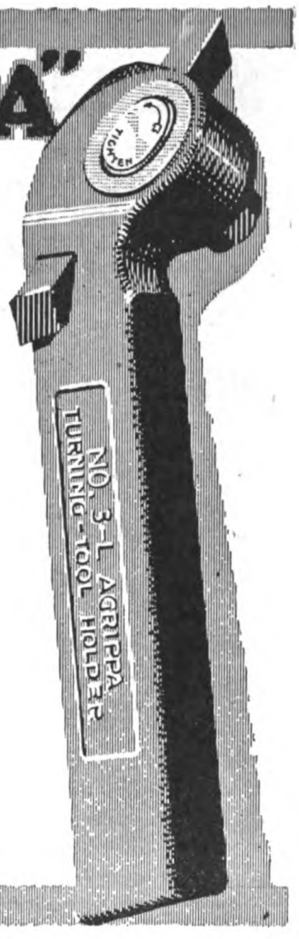
WILLIAMS' "AGRIPPA" TOOL HOLDERS



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A wide range of sizes in standard patterns for all regular machining operations: Turning, Boring, Planing, Threading, Knurling, Cutting-off and Side Work.

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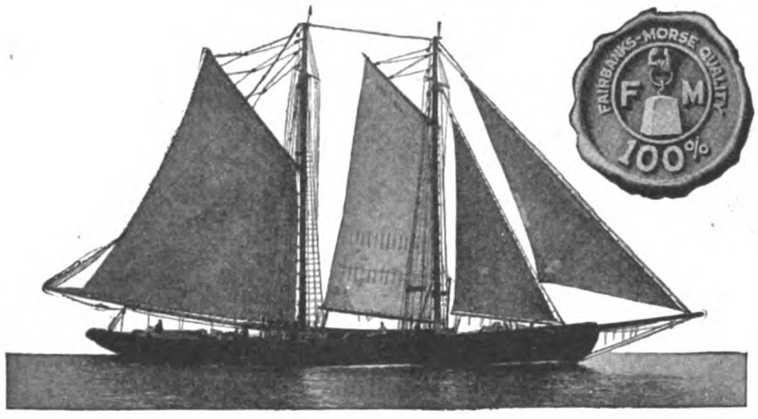
30 H. P. to 300 H. P.



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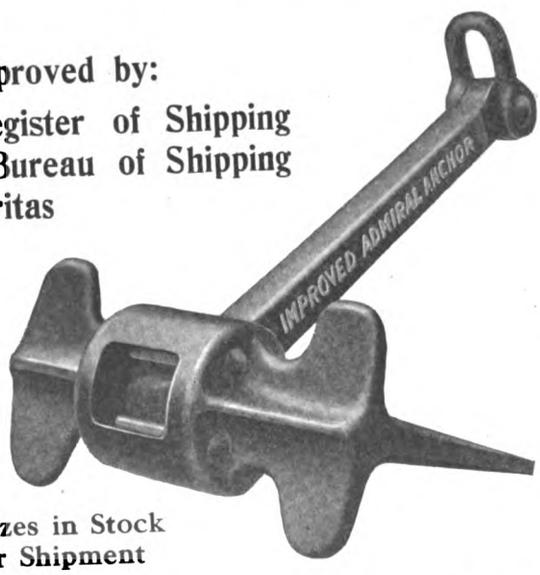

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Inspect your equipment now and order spare propeller-wheels and anchors to be made and stocked by us awaiting your directions.

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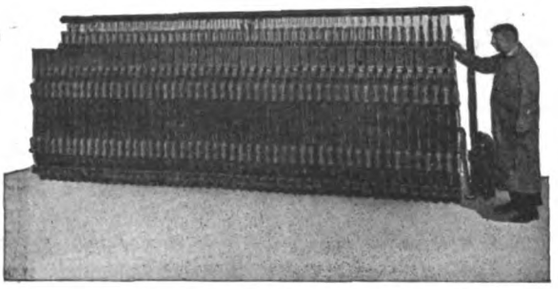

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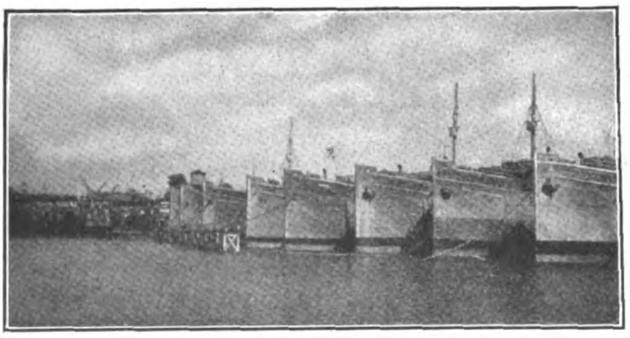

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Habirshaw marine wire is made either in accordance with the requirements of the Marine Code of the American Institute of Electrical Engineers, which we especially recommend, or in accordance with the requirements of the National Electrical Code.

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Malleable iron castings are proof against breakage. They allow no end-sway, side-sway, or rattle. Rough usage or the severest plunging at sea cannot crack a Southern-Rome berth.

This test proves it: Take a malleable iron casting. Strike it time and again with a hammer. It will not crack. (The old-style chilled casting, struck once with a hammer, is shattered to pieces.)

"Malleable iron castings at every joint" is why Southern-Rome marine bunks and berths are the best "buy" on the market.

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Branch of
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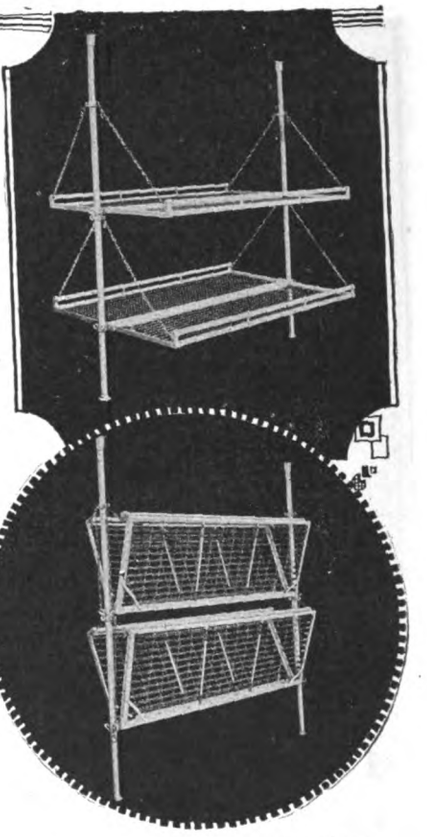

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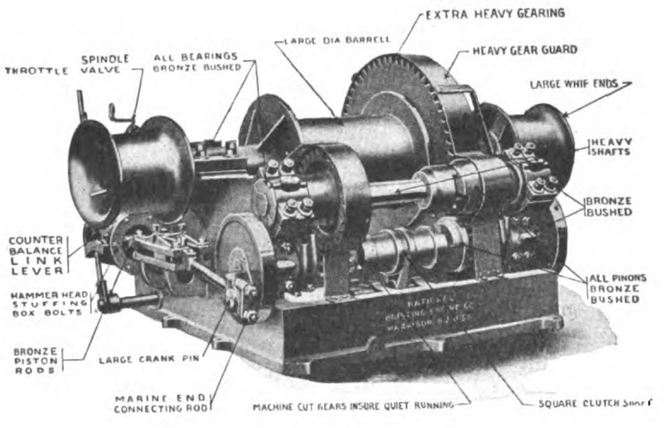

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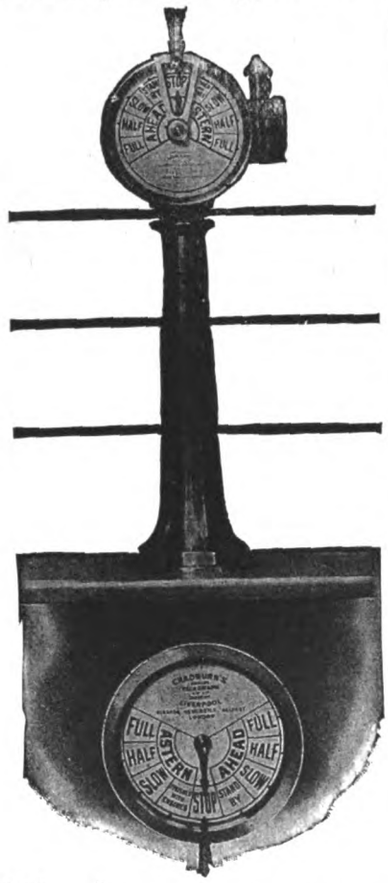

"LIBERTY V"

TYPE OF

ENGINE TELEGRAPH TRANSMITTER

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SEND FOR ADDITIONAL DATA AND SPECIFY

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W. E. Hadlock & Company, 152 State St., Boston, Mass.

R. C. Polk, 433 Perkins Building, Tacoma, Wash.

Low Upkeep

NORWALK AIR & GAS COMPRESSORS

Proof of quality in compressor manufacturing lies not only in original efficiency—but equally in the stamina which makes that efficiency permanent.

Wherever air or gas compressors are used the name Norwalk is accepted as a guarantee of long and troublefree service. Under all operating conditions the upkeep of a Norwalk compressor is slight, and its simple design and strength of construction make long life certain.

Write for Bulletins

on Norwalk Compressors for air, oxygen, hydrogen, acetylene and carbonic acid gas, one or all.

THE NORWALK IRON WORKS CO.

Pioneer Builders of Compressors

SOUTH NORWALK CONN.

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Western Electric
PORTABLE
UTILITY LIGHT

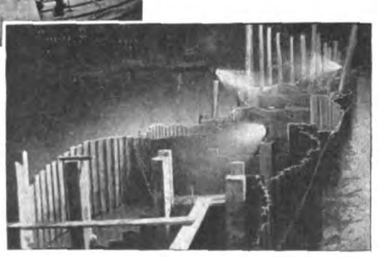
For Nighttime Efficiency

Highest efficiency in nightwork can only be obtained when the work is done in light bright enough to properly illuminate the work.

The Western Electric Portable Utility Light fully meets the demand for close range night illumination within restricted areas where the light is to be located at distances not greater than 100 to 125 feet.

For Shipyards

For General Marine Work

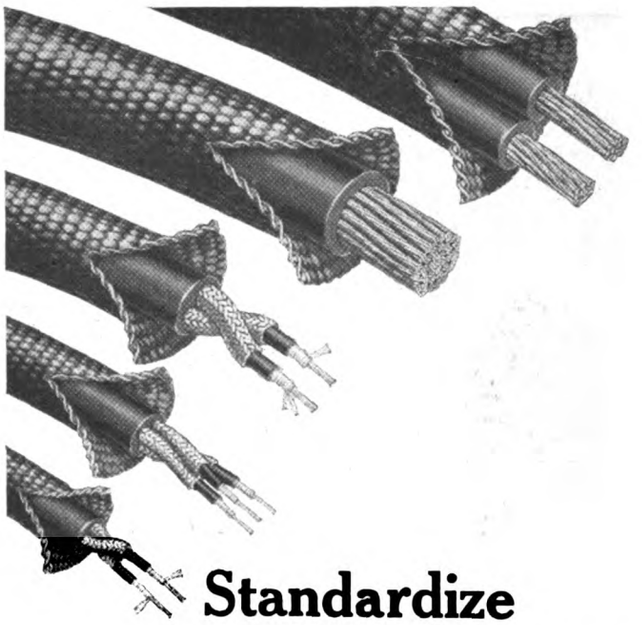


With this light operating on a 100 foot throw a 100 foot spread is obtained at an angle of 60 degrees.

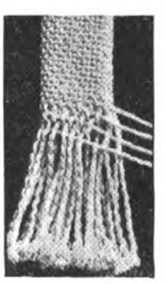
It is very rugged in construction, weighs but 30 pounds, no tools are needed for adjustments and it can be carried wherever you want it.

We also have 500 and 1,000 watt Flood Lights if a bigger light is required.

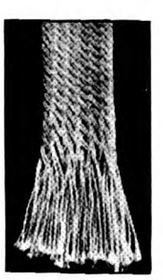
Western Electric Company
Offices in All Principal Cities



Standardize on Duracord



This is Duracord. Thick, heavy strands, woven like a piece of fire hose, not braided. Picture shows outside covering only with impregnating compound removed.



Here is the ordinary braided cable covering. Note the open and porous construction, easily cut, stretched or unraveled. Compare it with the illustration of Duracord above.

HUNDERDS of firms throughout the United States in every line of industry have adopted Duracord as their standard portable electric cord for all purposes.

In most cases these users started with a small amount of Duracord and watched results. Its thick, heavy *woven* covering established a record of endurance that brought forth the edict "Standardize on Duracord."

Duracord is made in 23 sizes

to fit all kinds of portable electric tools, extension lamps, sand and cement mixing machines, portable loaders, magnetic cranes, mining machines, mine locomotives, welders, storage battery charging outfits—anywhere in fact where portable cord is used.

If you are using Duracord for special work only check up its service record, and ask your electrical jobber for samples of the other sizes of cord you use.

If you have not yet used Duracord ask your jobber or write us direct for samples of Duracord and ordinary cord for you to test and compare yourself.

TUBULAR WOVEN FABRIC CO.
Pawtucket, R. I.

Makers of Duraduct
Flexible Non-Metallic Conduit
and tubular woven fabrics of all kinds

DURACORD
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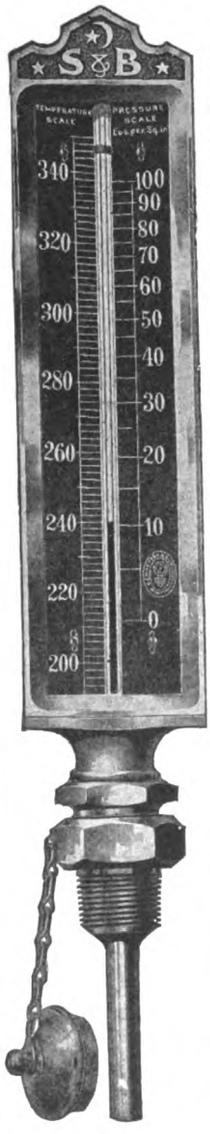
The "Crescent" Thermometer Predominates the Sea



IT will be found on many prominent war vessels of our Navy on most war and mercantile vessels built by American Ship Yards.

It is a sturdy, accurate and handsome Thermometer and lends itself admirably to the shipshape engine room.

Furnished in solid bronze V-Shaped case highly polished and finished. Scale is V-Shaped, finished in dull black with prominent silvered figures and graduating lines, and protected by removable plate glass front. Mercury tubes are highly magnifying.

Built, when specified in accordance with U. S. Navy specifications.

"Crescent" Thermometers for the Engine Room, for the Cold Storage Plant, Etc.

Also "Reform" Mercury Actuated Dial Thermometers and "Columbia" Recording Thermometers.

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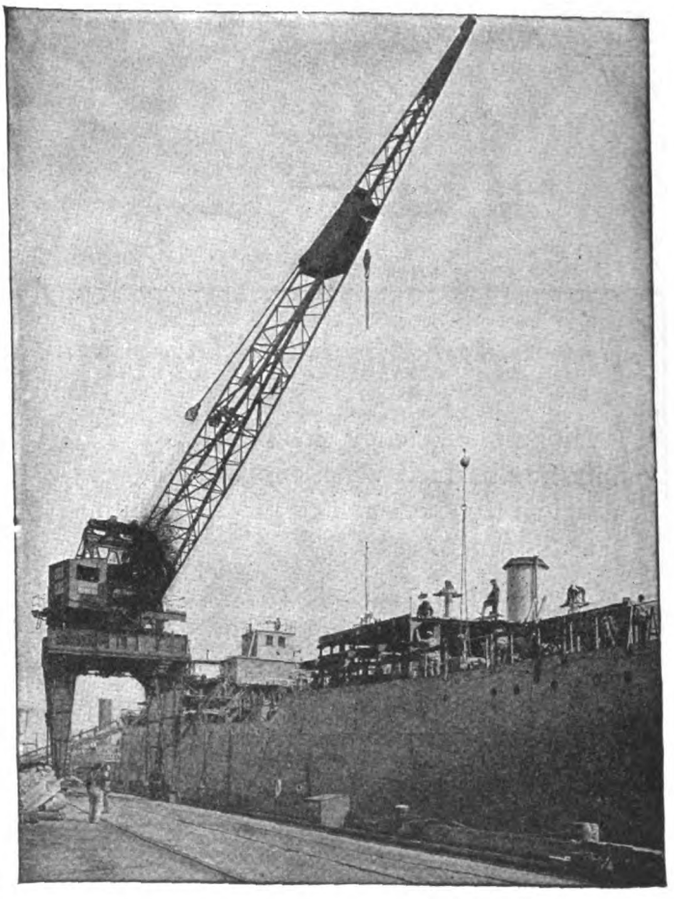

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Makes Freight Handling Easy

This big Brownhoist Portal Pier type Locomotive Crane will toy with most bulk and package cargoes which sometimes cause so much trouble in unloading. With its long, high boom it will reach any point on the ship, doing its work rapidly and with no confusion. Or with the auxiliary hoist, it has the titanic strength to lift packages weighing tons and to place them wherever you may choose.

The portal pier is made to span one or more railroad tracks and the cargo may be loaded into the waiting cars or placed in the near-by warehouses. It is a very useful machine about which you should know more. Write for catalog K.

The Brown Hoisting Machinery Company

40 Years in Crane Business

Engineers and Manufacturers of Heavy Dock Machinery, Bridge Cranes, Etc., as well as Smaller Cranes and Hoists.

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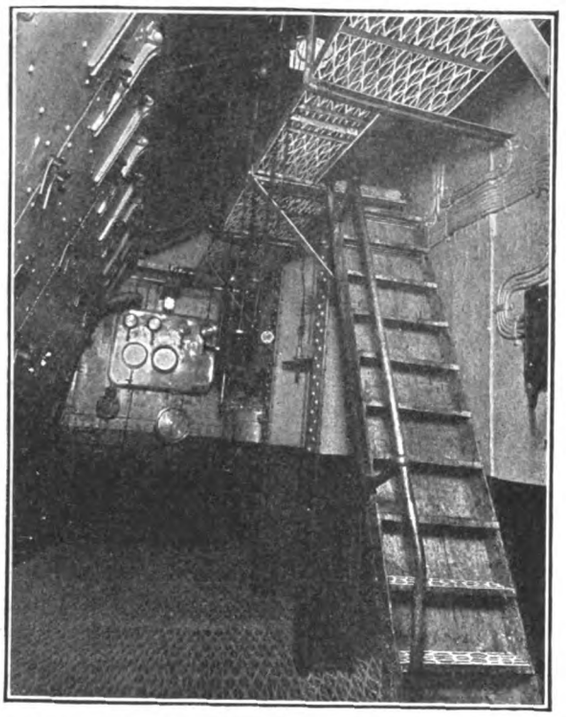
IRVING SUBWAY TRADE MARK (PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING



Irving Subway for floors, Irving Walkways and Irving Safsteps, in one of the new U. S. battleships.

The hold, boiler room and engine room of a ship are hot, stuffy places, to say the least. So why permit solid floors, galleries and stairs to shut off ventilation? Eighty per cent of the area of an **Irving Subway** panel is open space—ventilation area. Yet it is as strong and rigid, as easy to walk or work or wheel upon, as a solid plate of iron—with only a fraction of the weight.

The convenient size of the panels makes it easy to cover an area of any size and shape. There is no recorded instance of **Irving Subway** wearing out. It has an absolutely non-slipping surface always.

Think of floor ventilation. Then remember that you cannot buy a better, stronger and less expensive ventilating flooring than **Irving Subway.**

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IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.

Workers in Iron and Steel to Quality Standards and Manufacturers of

IRVING SAFSTEP TRADE MARK (PATENTED)
ABSOLUTELY NON-SLIPPING ALWAYS

How much oil for a smoke-screen?

The Pneumercator Tank Gauge gives the U. S. Navy the exact figures.

And it does more. It provides a perpetual inventory of the contents of the fuel-oil tanks, without sounding or computations. And an automatic electric alarm—no electrical connections to tanks or other fire risks—sounds when the contents of the tanks have reached a predetermined high or low level.

Not only the U. S. Navy but other Navies and Companies operating oil-burning ships are making use of the Pneumercator Tank Gauge. They find it gives them the most reliable figures with the minimum of trouble.

May we send full information?

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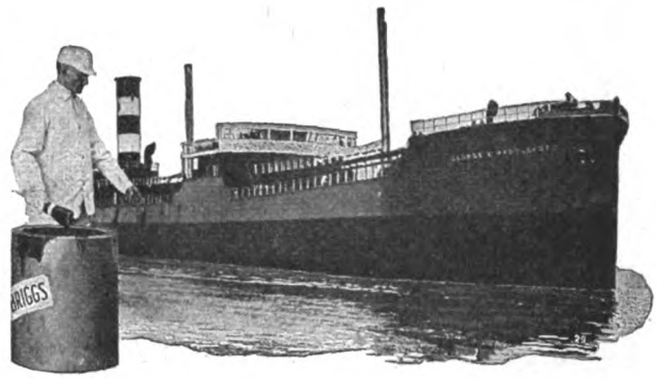
NEW YORK'S PIONEER STEEL SHIPBUILDERS



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—"Bituminous Bill."

Says "Bituminous Bill":

'Tis a shame the way some people let corrosion eat away the inner plating of ships. All foresighted shipowners use protective coatings, and nine chances out of ten, 'tis Briggs. An ounce of prevention is worth a pound of cure—and Briggs is the least costly corrosion preventive you can buy.

For places hard to get at, where corrosion is always sure to lurk, Briggs Bituminous Composition is a sure and certain protective. Recommended for cellular double bottoms, peak tanks, refrigeration spaces, engine and boiler settings, chain lockers, ballast tanks, coal bunkers and other places.

Briggs affords a tough wear-resisting coating. *It's* the *least costly protection* for vessels of any type.

Send for booklet, "The Solution of the Corrosion Problem."

B-19

Briggs Bituminous Composition Co., Inc.

17 Battery Place **New York, N. Y.**

BRIGGS

BITUMINOUS COATINGS

The Solution of the Corrosion Problem

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There's a Starrett Blade to suit any kind, size or shape of material. The Starrett Hack Saw Chart points out just which blade to use and how to use it. Choose the right blade, put it to work in the right way, and let it prove that Starrett Blades "cut quicker and last longer."

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Manufacturers of Hack Saws Unexcelled
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Use Starrett Tools

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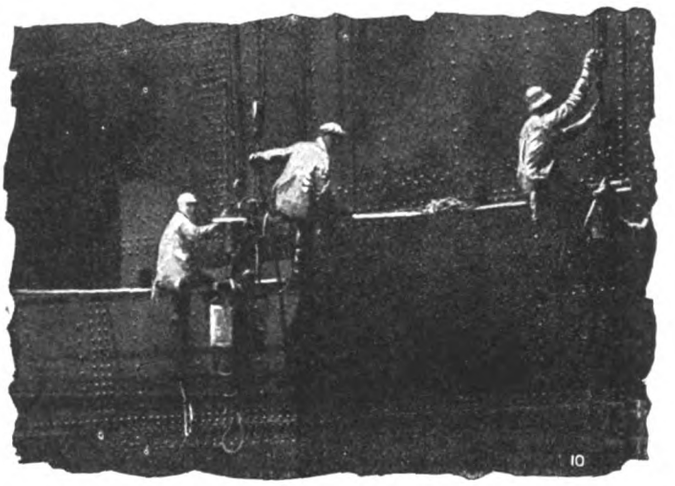
FEDERAL

TRADE-MARK

TOPSIDE PAINTS

as well as

BOTTOM COMPOSITIONS



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In choosing Federal Topside Paints, your selection is a wise one that will mean lasting protection and lower cost in the final reckoning.

You have known and used Federal Bottom Compositions for years—you know the maker and know there is none better. Stick to Federal.

The Company will gladly furnish estimates to clean and paint interiors or exteriors of vessels of any type.

Descriptive circular on request.

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"Weather-best"

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GREY STRAND is a symbol of the Wickwire Spencer guarantee of the careful selection of materials, expert workmanship and thorough inspection.

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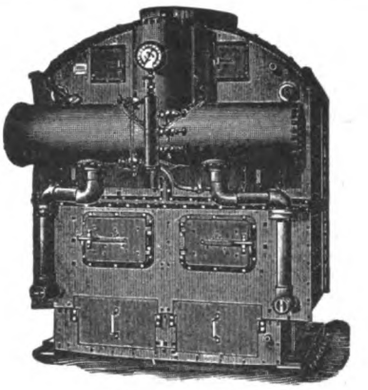

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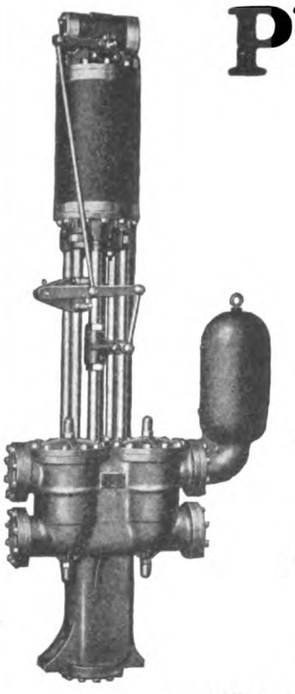

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ENGINES—TURBINES

EST. 1848

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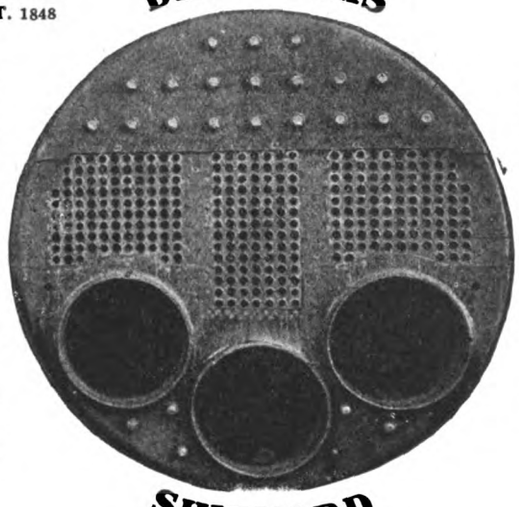

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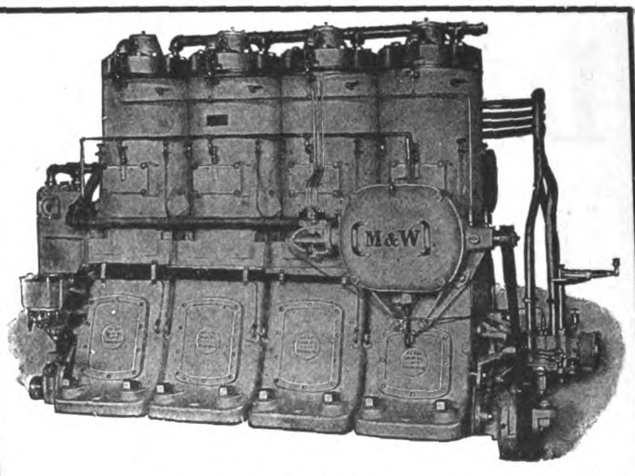

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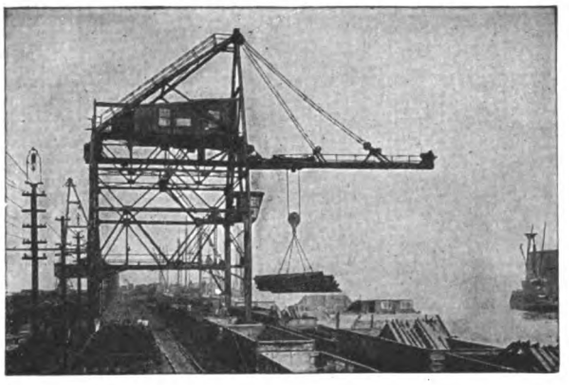

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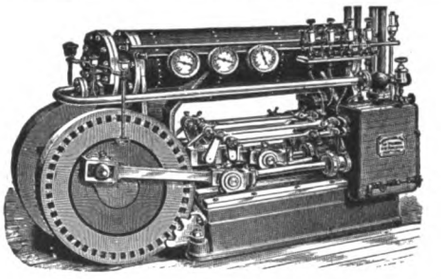

The Allen Dense Air Ice Machine

Contains no chemicals, only air at easy pressure (65 lbs.) in pipes. It is placed in the engine room and attended by the regular engineers, while meat room and ice-making box and galley and pantry refrigerators are at their usual places. Proven by many years' service in the Tropics on U. S. men-of-War, steam yachts and passenger steamers. It is as noiseless as any steam engine.

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About 300 are in active service on U. S. and foreign men-of-war, steam yachts, and merchant steamers in the Tropics.

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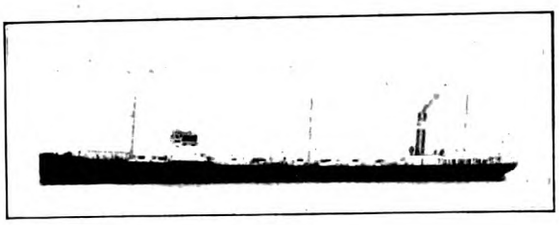

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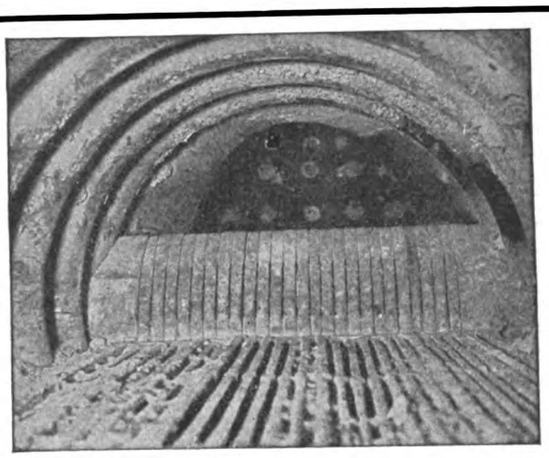

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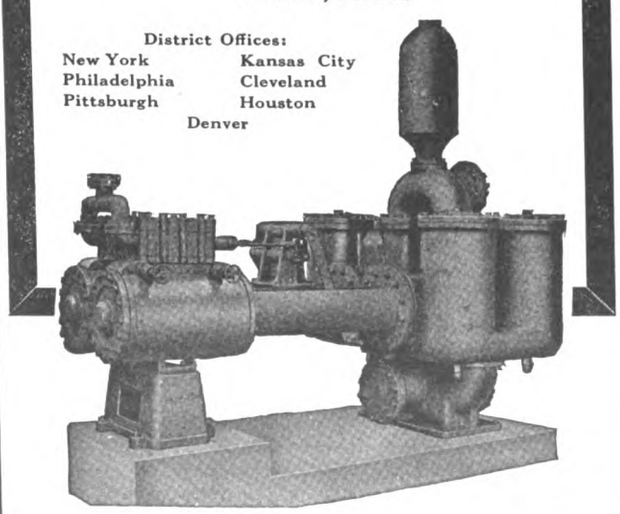

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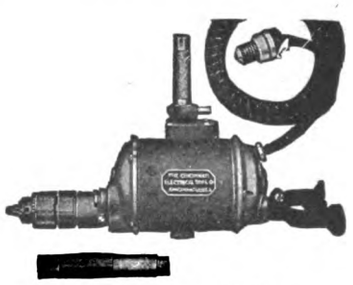

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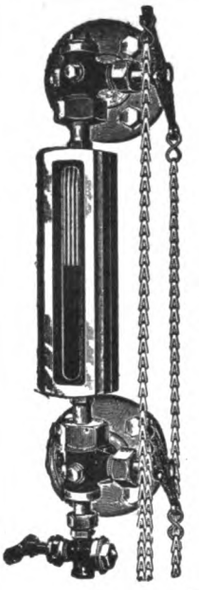

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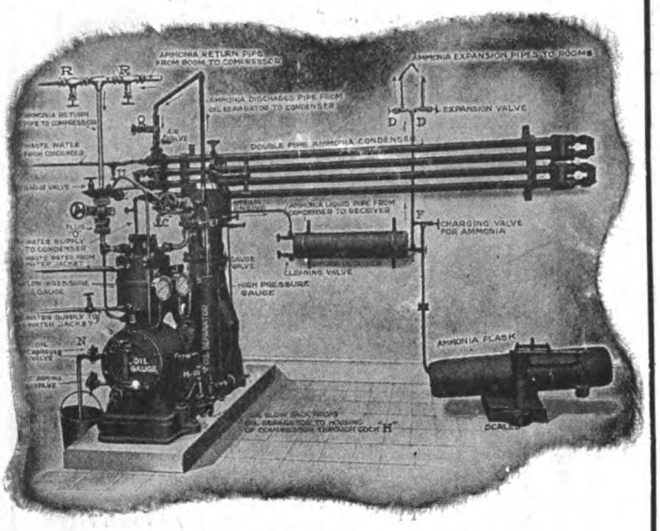

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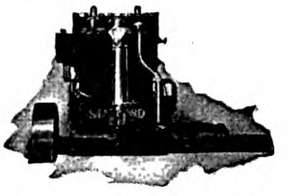

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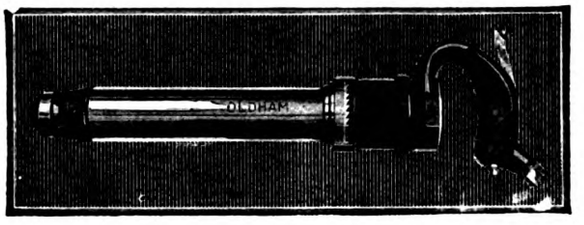

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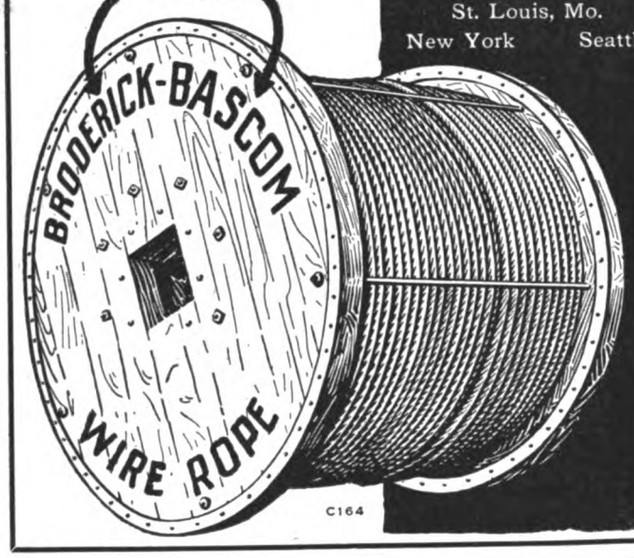

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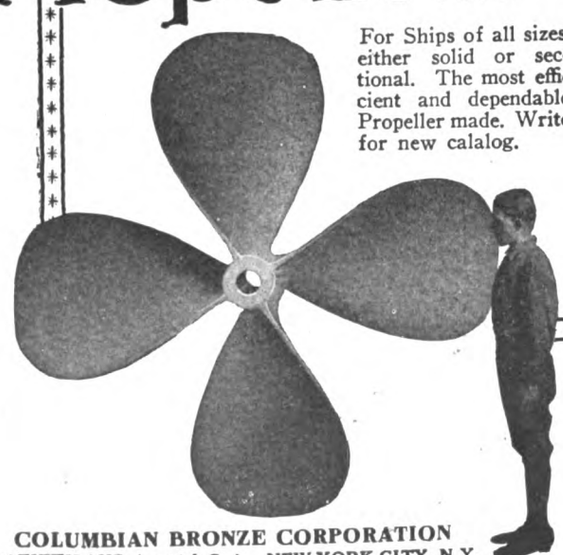

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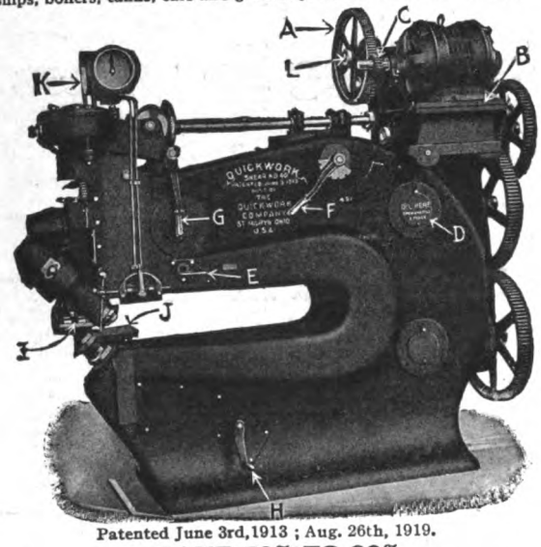

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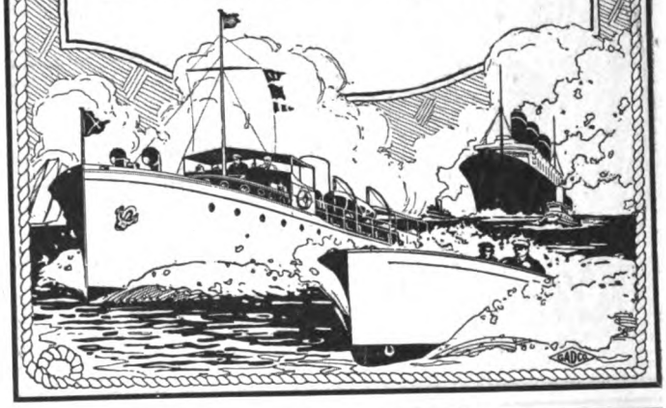

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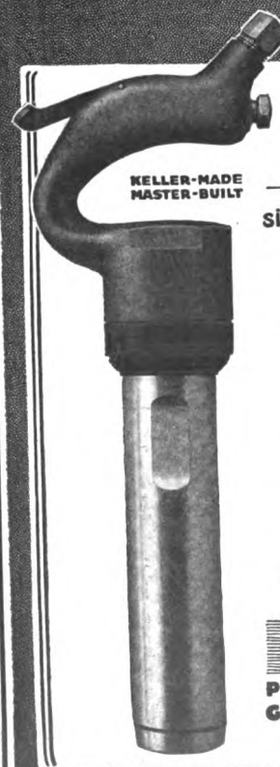

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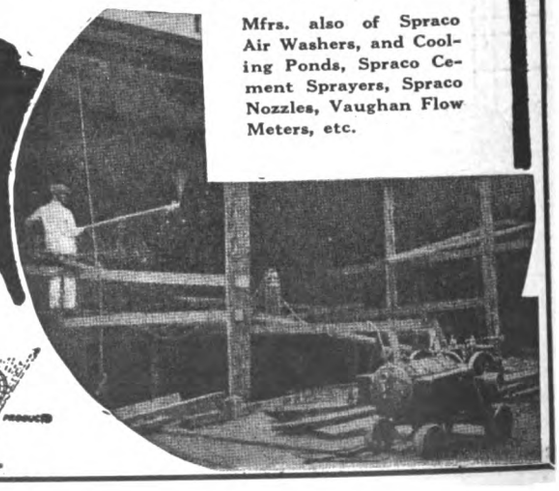

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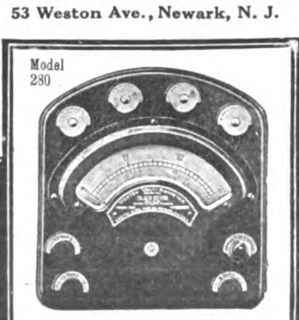

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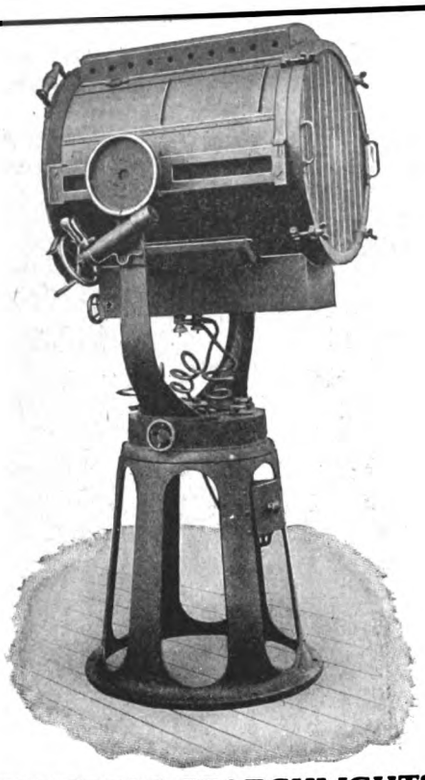

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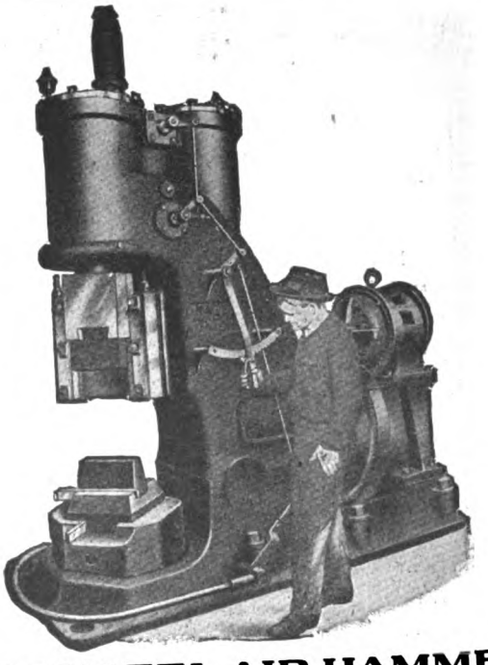

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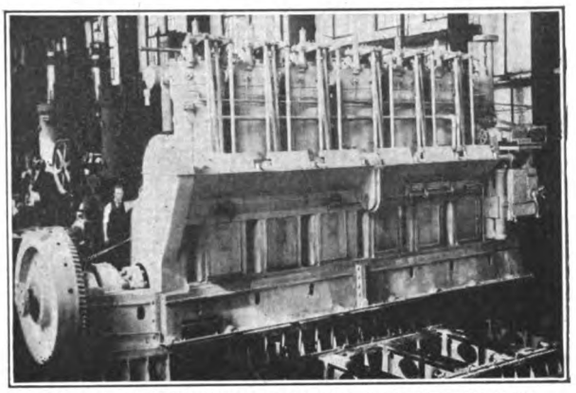

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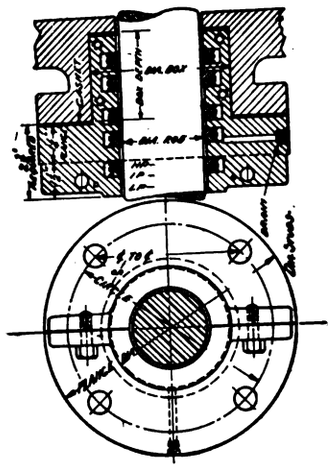

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Plate F-1268

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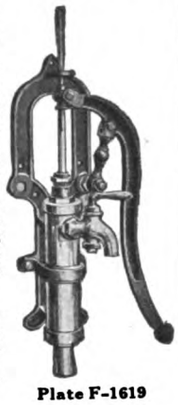

Brass Galley Bulkhead Pump, mounted on iron frame polished faucet, handle reversible.

Plate F-1619

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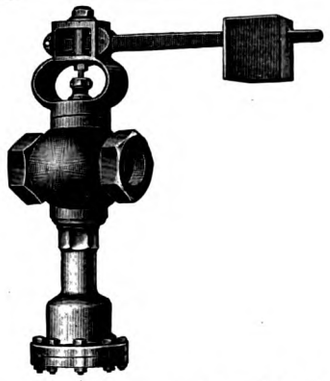

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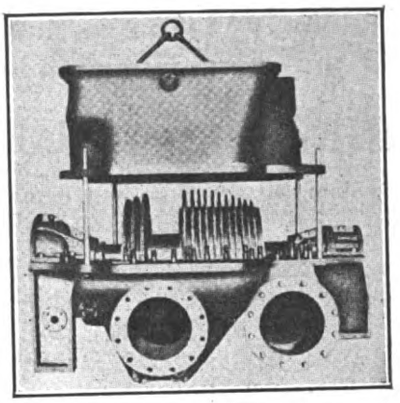

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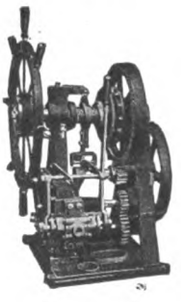

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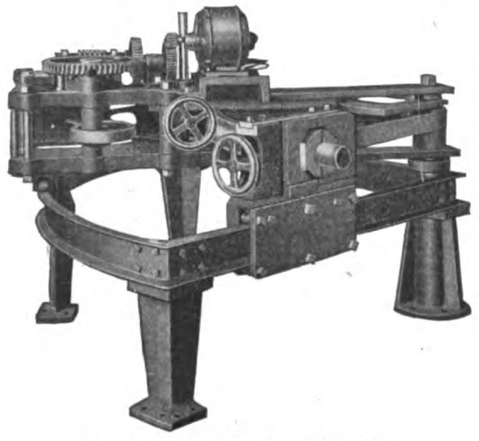

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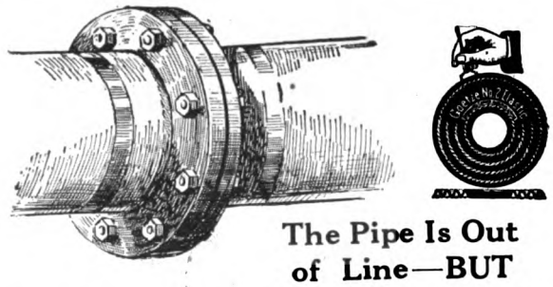

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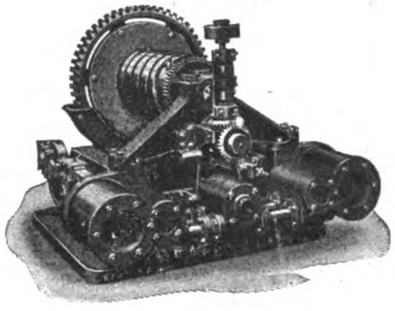

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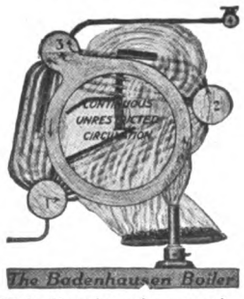

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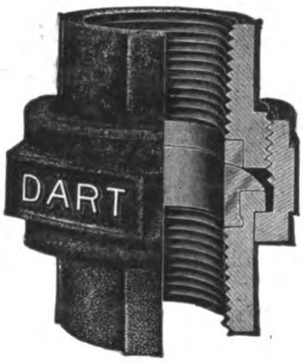

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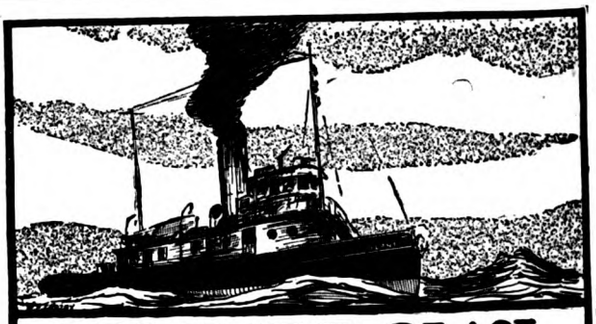

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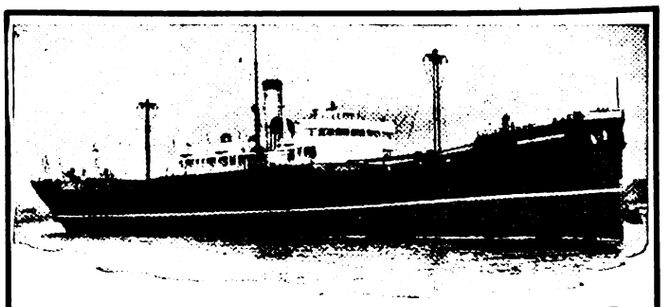

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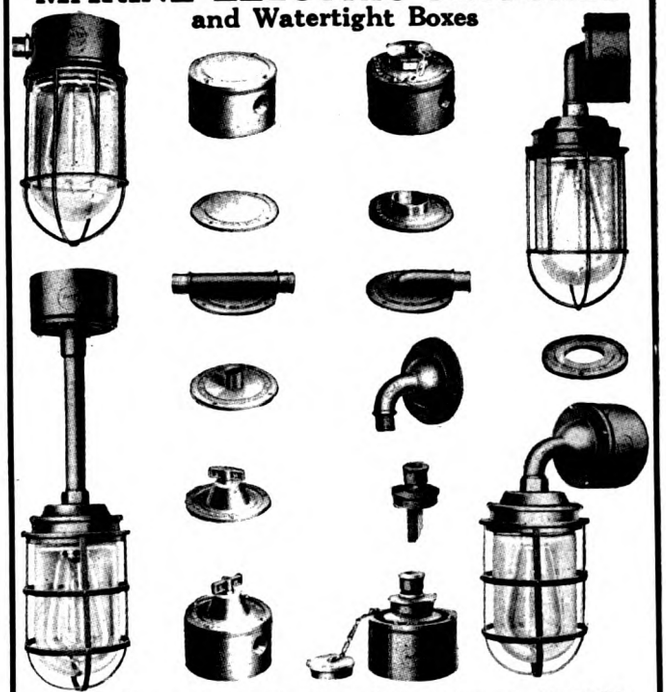

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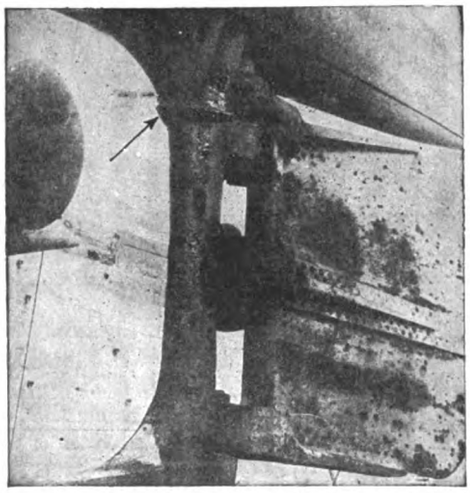

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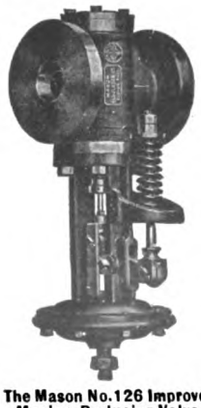

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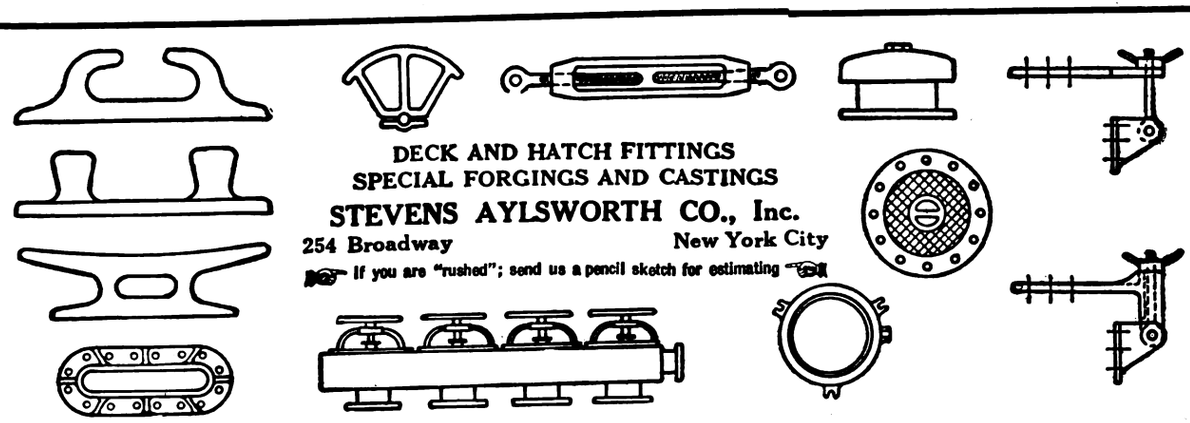

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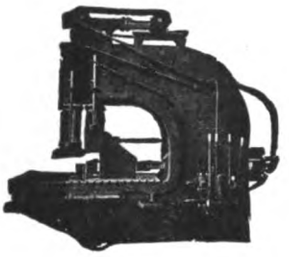

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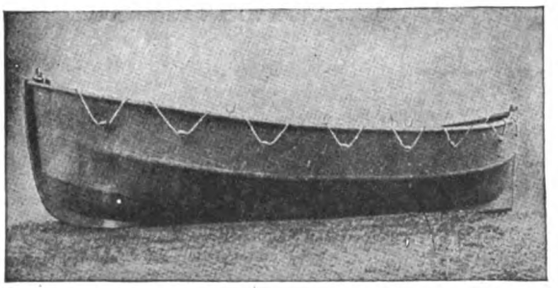

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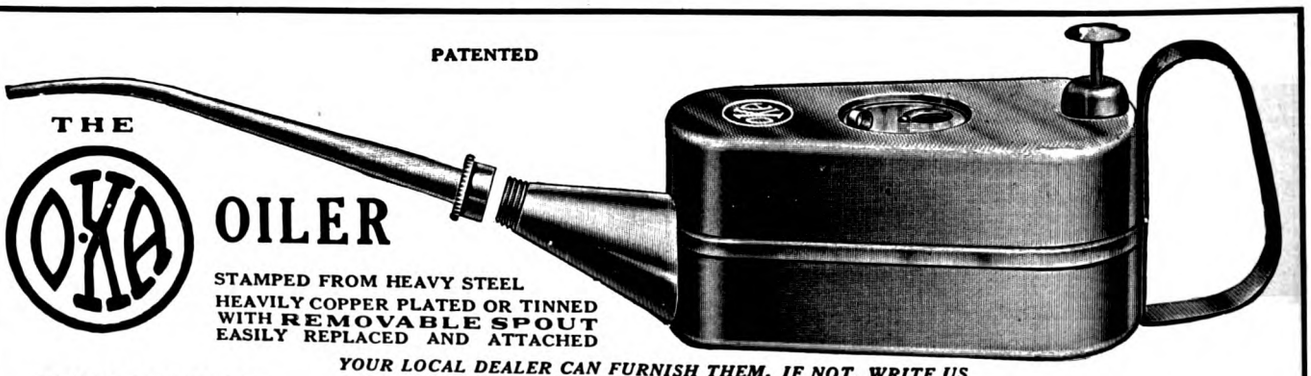

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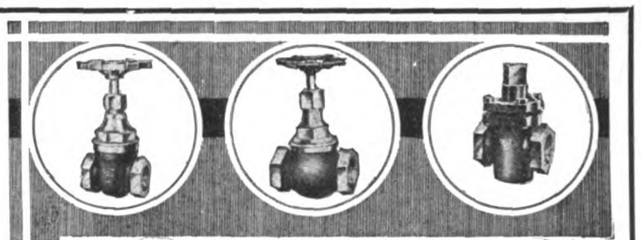

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BOILER FLUE CLEANERS
Maritime Engineering & Sales Corp.

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SUN OILS

Let us analyze your lubrication problems

The Sun Company is one of the world's largest producers, refiners and shippers of petroleum products. Its output of lubricating oils alone exceeds a million and a half gallons per week.

The Sun Company has specialized for a quarter century in lubricating oils. It has developed into an organization of lubrication experts, its aim being to supply accurate and efficient lubrication instead of just "oil."

The choice of a lubricant for any particular purpose demands expert advice. Engineers of the Sun Company are available to make an analysis of your lubrication requirements and specify the right lubricants to meet them. This service is free.

Good Ships Deserve Good Oil

Viking Marine Engine Oil—for thrust bearing and reciprocating engine lubrication—is the latest development among the Sun Marine Oils.

Viking Engine Oil, by reason of a special refining process, will form a perfect and lasting emulsion with either salt or fresh water. It is neutral in reaction, contains no acids to corrode metal parts, will not deteriorate and become rancid with age, and is unaffected by temperature changes.

Viking Oil conforms in efficiency with the high standards of the famous Sun XX Marine Oil.

Other Sun Marine Oils are Sun Turbine Oil and Sun Monitor Cylinder Oil. Watch for our special announcements regarding each.

SUN OILS

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Producer, Refiner and Distributor of Petroleum Products

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BITUMINOUS COATINGS
Briggs Bituminous Composition Co., Inc.
Wailes Dove-Hermiston Corp.

BLOCKS
(See Chain Hoists and Blocks; also Tackle Blocks.)

BLOWERS
(Also see Soot Blowers.)
Buffalo Forge Co.
De Laval Steam Turbine Co.
General Electric Co.
Howden & Co.
Kearfott Engineering Co.
Reid & Co., John.
Schutte & Koerting Co.
Terry Steam Turbine Co.
Westinghouse Electric & Mfg. Co.

BLOW-OFF VALVES
Crane Co., The.
Lunkenheimer Co., The.
Powell Co., The William.
Pratt & Cady Co., Inc.
Williams Valve Co., D. T.
Williams, Wm. E.

BLUE PRINTING PAPER
New York Blue Print Paper Co.

BOAT ACCESSORIES
American Balsa Co.
Ferdinand, L. W., & Co.
Sands, A. B., & Son Co.
Stevens-Aylsworth Co., Inc.
Steward Davit & Equip. Corp.
Williams, Wm. E.

BOAT BUILDERS
(See Launches and Yachts.)

BOAT DAVITS
(See Davits.)

BOAT FITTINGS
Cory, Chas., & Son, Inc.
Ferdinand, I. W., & Co.
Sands, A. B., & Son Co.
Tiebout, W. & J.
Williams, Wm. E.

BOAT NAILS
Malleable Iron Fittings Co.
Williams, Wm. E.

BOATS
(See Life Boats; also Launches and Yachts.)

BOILER BRACES
Lukens Steel Co.

BOILERS
Almy Watertube Boiler Co.
American Ship Building Co.
American Spiral Pipe Works.
Babcock & Wilcox Co.
Badenhausen Co.
Baltimore Dry Docks & Shipbldg. Co.
Bath Iron Works.
Bethlehem Shipbuilding Corp.
Charleston Dry Dock & Machine Co.
Consolidated Shipbuilding Corp.
Cramp, Wm., & Sons Ship & Engine Building Co.
Fletcher, W. & A., Co.
Foster Marine Boiler Corp.
Heine Safety Boiler Co.
Howden, James, & Co.
Hyde Windlass Co.
Kearfott Engineering Co.
Lake Erie Boiler Works.
Morse Dry Dock & Repair Co.
New York Engineering Co.
Pacific Marine Iron Works.
Staten Island Shipbuilding Co.
Vulcan Iron Works, Inc.
Ward, Charles, Eng. Works.

BOILER CIRCULATIONS
Schutte & Koerting Co.

BOILER CIRCULATION (ECKLIFF)
Dew Valve Co.

BOILER COMPOUNDS
Waycott, A. K.

BOILER COVERINGS
(See Non-Conducting Covering.)

BOILER EXPANDERS
Watson-Stillman Co.
Williams, Wm. E.

BOILER FEEDERS
(See Feed-Water Regulators.)

BOILER FEED PUMPS
(See Pumps.)
Alberger Pump & Condenser Co.
Buffalo Steam Pump Co.
Cameron Steam Pump Works.
Davidson Co., M. T.
Dean Bros. Steam Pump Works.
De Laval Steam Turbine Co.
Fairbanks, Morse & Co.
Morris Machine Works.
Schutte & Koerting Co.
Terry Steam Turbine Co.
Williams, Wm. E.
Worthington Pump & Mach. Corp.

BOILER FLUE CLEANERS
The Diamond Power Specialty Co.
Independent Pneumatic Tool Co.
Maritime Engineering & Sales Corp.
Ryerson, Jos. T., & Son.
Williams, Wm. E.

BOILER FLUE CUTTERS AND EXPANDERS
Independent Pneumatic Tool Co.
Ryerson, Jos. T., & Son.

BOILER GAUGE GLASSES
(See Gauge Glasses.)

BOILER GRAPHITE
Dixon, Jos., Crucible Co.

BOILER HEADS
Lukens Steel Co.
Ryerson, Jos. T., & Son.

BOILER MAKERS' TEST PUMPS
(See Test Pumps.)

BOILER NOZZLES, WELDED STEEL
American Spiral Pipe Works.
Continental Iron Works, The.
Ryerson, Jos. T., & Son.

BOILER PLATES
(See Steel Plates.)

BOILER RIVETS
(See Rivets.)

BOILER RIVETERS
(See Power Riveters.)

BOILER ROOM FITTINGS
American Steam Gauge & Valve Mfg. Co.
Ashton Valve Co.
Crane Co., The.
Howden, James, & Co.
Jerguson Gage & Valve Co.
Kearfott Engineering Co.
Kinney Manufacturing Co.
Lunkenheimer Co., The.
Mason Regulator Co.
Powell Co., The William.
Reid & Co., John.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.
Union Water Meter Co.
Williams Valve Co., D. T.
Williams, Wm. E.

BOILER SCALING
Morse Dry Dock & Repair Co.

BOILER STAYBOLTS
(See Staybolts.)

BOILER, STEAM AND WATER DRUMS, WELDED
Continental Iron Works, The.
Morse Dry Dock & Repair Co.

BOILER TUBE RETARDERS
Reid & Co., John.
Williams, Wm. E.

BOILER TUBES
Harvey Co., Arthur C.
Kearfott Engineering Co.
National Tube Co.
Parkesburg Iron Co.
Ryerson, Jos. T., & Son.
Williams, Wm. E.

BOLTS AND NUTS
Russell, Burdsall & Ward Bolt & Nut Co.
Ryerson, Jos. T., & Son.
Williams, Wm. E.

BOLT AND NUT ASSEMBLING MACHINES
International Reclaiming Co. . .

BOLT AND RIVET CLIPPERS
Baird Pneumatic Tool Co.

BOOMS—TUBULAR STEEL
National Tube Co.

BORING BARS
(See Cylinder Boring Bars.)

BORING MACHINES—METAL WORKING
Ingersoll-Rand Co.
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

BORING MACHINES—WOOD
Chicago Pneumatic Tool Co.
Cleveland Pneumatic Tool Co.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.

BORING AND TURNING MILLS
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

BOTTOM PAINTS FOR SHIPS
International Compositions Co.

BRASS AND COPPER
Chase Metal Works.
Chase Rolling Mill Co.
Sands, A. B., & Son Co.
Williams, Wm. E.

BRASS CASTINGS
(See Castings-Brass.)

BRASS FITTINGS
American Steam Gauge & Valve Mfg. Co.
Ashton Valve Co.
Bridgeport Brass Co.
Chase Rolling Mill Co.
Crane Company, The.
Lunkenheimer Co., The.
Mason Regulator Co.
Powell Co., The William.
Sands, A. B., & Son Co.
Tiebout, W. & J.
Waterbury Mfg. Co.
Williams Valve Mfg. Co.
Williams, Wm. E.

BRAZING MATERIALS
Smooth-On Manufacturing Co.

BRICK
(See Fire Brick.)

BRIDGE CONTROL
Westinghouse Electric & Mfg. Co.

BRIDGE WALLS
(See Furnace Bridge Walls.)

BROKERS
(See Ship Brokers.)

BRONZE
American Manganese Bronze Co.
Chase Metal Works.
Chase Rolling Mill Co.
Columbian Bronze Corp.
Cramp & Sons, Wm., Ship & Engine Bldg. Co.
Crane Co.
Lunkenheimer Co.
Powell Co., The William.
Williams Valve Co., D. T.
Williams, Wm. E.

BUNKS
Bernstein Mfg. Co.
Foster Bros. Mfg. Co.
Southern-Rome Co.

BUOYS
Williams, Wm. E.

BUOYS, RING
Ferdinand & Co., L. W.
Williams, Wm. E.

BURNERS, FUEL OIL
(See Fuel Oil Burners.)

BUSHINGS
Crane Co., The.
Lunkenheimer Co., The,
Williams, Wm. E.,

BY-PASS VALVES
Crane Co., The,
Griscom-Russell Co.
Lunkenheimer Co., The.
Powell Co., The William.
Schutte & Koerting Co.

CABLES OF ALL KINDS FOR LIGHT AND POWER
Habirshaw Electric Cable Co.
Standard Underground Cable Co.

CABLES
(See Chain; also Rope.)
National Malleable Castings Co.

CABLE COVERINGS
Tubular Woven Fabric Co.

CABLEWAYS
(See Marine Cableways.)

CALIPER GAUGES
Williams & Co., J. H.

CALKING MACHINERY
Ingersoll-Rand Co.

CALKING TOOLS
Williams, Wm. E.

CAM SHAFTS
Pollak Steel Co.

CANOE GLUE
Ferdinand & Co., L. W.

CANVAS
Williams, Wm. E.

CANVAS PRESERVATIVE AND WATERPROOFING MATERIAL
Robeson Preservo Co.

CAPSTANS
(Steam, Electric, Hand.)
American Engineering Co.
Dake Engine Co.
Flory, S., Manufacturing Co.
Hadfield-Penfield Steel Co.
Hyde Windlass Co.
Maine Electric Co.
Mundy Hoisting Engine Co.
National Hoisting Engine Co.
Thacher Propeller & Foundry Corp.
Williams, Wm. E.

CARBON DIOXIDE, VALVES AND FITTINGS
Frick Co.
York Manufacturing Co.

CARBON DIOXIDE MACHINES
Frick Co.
York Manufacturing Co.

CAR DUMPERS
Brown Hoisting Machinery Co.
McMyler Interstate Co.

CARGO HOISTS
(See Hoisting Engines.)

CARGO HOISTING BLOCKS
Parish Supply & &Mfg. Co.

CARGO LIGHTS
Benjamin Electric Mfg. Co.
General Electric Co.
Western Electric Co.
Williams, Wm. E.

CARGO WINCHES
(See Winches.)
O'Rourke Crane & Enginer'g Co.

CAR PULLERS—ELECTRIC
Mead-Morrison Mfg. Co.

CASTINGS—ALUMINUM
Griscom-Russell Co.
Hyde Windlass Co.
Hooven, Owens, Rentschler Co.
Lunkenheimer Co., The.
Powell Co., The William.
Sands, A. B., & Son Co.
Stevens Aylsworth Co., Inc.

CASTINGS—BRASS
Benjamin Electric Mfg. Co.
Bridgeport Brass Co.
Charleston Dry Dock & Machine Co.
Cory, Chas., & Son, Inc.
Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Crane Co.
Fletcher, W. & A. Co.
Griscom-Russell Co.
Hyde Windlass Co.
Lunkenheimer Co., The.
Powell Co., The William.
Rostand Manufacturing Co.
Sands, A. B., & Son Co.
Tiebout, W. & J.
Williams Valve Co., D. T.
Williams, Wm. E.

CASTING—BRONZE
American Manganese Bronze Co.
American Steel Foundries.
Benjamin Electric Mfg. Co.
Charleston Dry Dock & Machine Co.
Chase Metal Works.
Chase Rolling Mill Co.
Columbian Bronze Corp.
Cory, Charles & Son, Inc.
Cramp & Sons, Wm., Ship & Engine Bldg. Co.
Crane Co., The.
Fletcher Co., W. & A.

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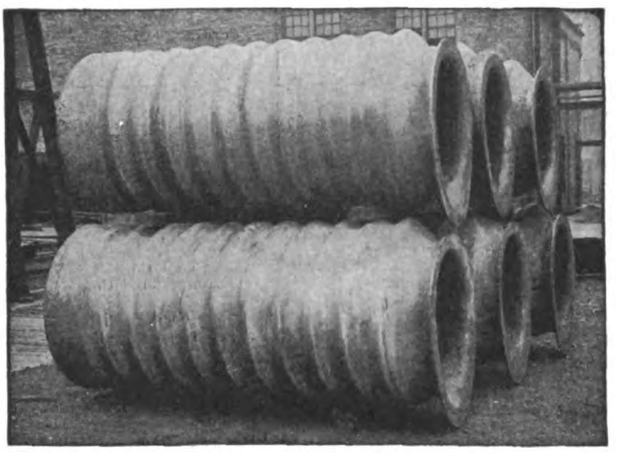

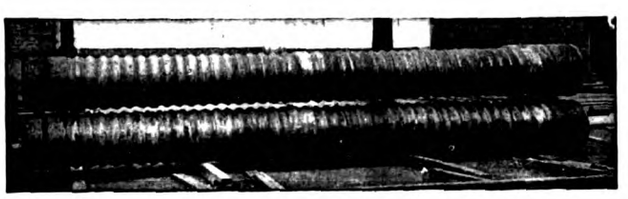

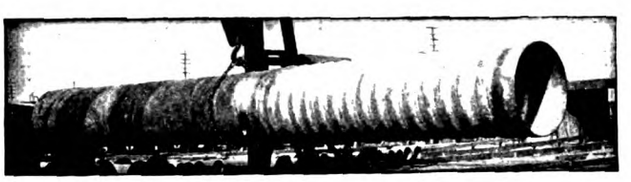

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Lunkenheimer Co., The.
Malleable Iron Fittings Co.
Penn Seaboard Steel Corp.
Powell Co., The William.
Rostand Mfg. Co.
Sands, A. B., & Son Co.
Stevens-Aylsworth Co., Inc.
Tiebout, W. & J.
Williams Valve Co., D. T.
Williams, Wm. E.

CAPSTANS
Allan-Cunningham Co.
Maritime Engineering & Sales Corp.

CASTINGS—BRASS AND BRONZE
Bath Iron Works.

CASTINGS—GRAY IRON
Hooven, Owens, Rentschler Co.
Mesta Machine Co.
Norwalk Iron Works.
Stevens-Aylsworth Co., Inc.
Thacher Propeller & Foundry Corp.
Williams, Wm. E.

CASTINGS—MONEL METAL
International Nickel Co.

CASTINGS—STEEL
American Steel Foundries.
Chase Metal Works.
Chase Rolling Mill Co.
Cramp & Sons, Wm., Ship & Engine Bldg. Co.
Crane Co., The.
Fletcher Co., W. & A.
Griscom-Russell Co.
Hardie-Tynes Mfg. Co.
Hooven, Owens, Rentschler Co.
Hyde Windlass Co.
Lunkenheimer Co., The.
Mesta Machine Co.
National Malleable Castings Co.
Penn Seaboard Steel Corp.
Sands, A. B., & Son Co.
Stevens-Aylsworth Co., Inc.

CEILINGS
(Cabin.)
Marine Decking & Supply Co.

CEMENT—LINOLEUM
Ferdinand & Co., L. W.

CENTRIFUGAL OIL PURIFIERS
De Laval Separator Co.

CENTRIFUGAL PUMPS
Alberger Pump & Condenser Co.
Cameron Steam Pump Wks, A. S.
Fairbanks, Morse & Co.
Morris Machine Works.
National Machine Engine Works.
Westinghouse Electric & Mfg. Co.
Wheeler Manufacturing Co.
Williams, Wm. E.
Worthington Pump & Mach. Corp.

CHAIN
Baldt Anchor Co.
Cory, Chas., & Son, Inc.
Harvey Co., Arthur C.
Kearfott Engineering Co.
National Malleable Castings Co.
Ryerson, Jos. T., & Son.
U. S. Chain & Forging Co.

CHAIN HOISTS AND BLOCKS
Chisholm-Moore Mfg. Co.
Ford Chain Block Co.
Niles-Bement-Pond Co.
Parish Supply & Mfg. Co.
Ryerson, Jos. T., & Son.
Williams, Wm. E.
Wright Mfg. Co.
Yale & Towne Mfg. Co.

CHAIN PIPE WRENCHES
American Engineering Co.
Williams, Wm. E.

CHAIN STOPPERS
American Engineering Co.
Williams, Wm. E.

CHAIN VALVE WHEELS
Lunkenheimer Co., The.
Powell Co., The William.

CHANNELS
Pollak Steel Co.

CHARCOAL IRON BOILER TUBES
Harvey Co., Arthur C.
Parkesburg Iron Co.
Ryerson, Jos. T., & Son.
Williams, Wm. E.

CHECK VALVES—BRASS AND IRON
Crane Co., The.
Lunkenheimer Co., The.
Mott Iron Works, J. L.
Powell Co., The William
Pratt & Cady Co., Inc.
Sands & Son Co., A. B.
Schutte & Koerting Co.
Watson-Stillman Co.
Williams Valve Co., D. T.
Williams, Wm. E.

CHEMICALS
(See Boiler Compounds.)

CHIPPING HAMMERS
(See Pneumatic Tools.)

CHISELS
Keller Pneumatic Tool Co.
Williams, Wm. E.

CHISEL BLANKS
Cleveland Punch & Shear Works Co.
Ingersoll-Rand Co.
Keller Pneumatic Tool Co.

CHRONOMETERS
Williams, Wm. E.

CHRONOMETER VALVES
Union Water Meter Co.
Williams, Wm. E.

CHOCKS
American Engineering Co.
Penn Seaboard Steel Corp.
Thacher Propeller & Foundry Corp.
Williams, Wm. E.

CHOCK FITTINGS
Stewart Davit & Equip. Corp.

CHUCKS
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Keller Pneumatic Tool Co.
Rostand Mfg. Co.
Williams, Wm. E.

CIRCULAR SHEARS
The Quickwork Co.

CIRCULATING PUMPS
Alberger Pump & Condenser Co.
Cameron Steam Pump Wks, A. S.
Davidson Company, M. T.
Dean Bros. Steam Pump Works.
De Laval Steam Turbine Co.
Fairbanks, Morse & Co.
Howden, James, & Co., Ltd.
Hush, H. J.
Morris Machine Works.
Terry Steam Turbine Co.
Westinghouse Electric & Mfg. Co.
Wheeler Mfg. Co., C. H.
Williams, Wm. E.
Worthington Pump & Mach. Corp.

CIRCULATORS
(See Boiler Circulators.)

CLAMPS — MACHINISTS AND TOOL MAKERS
Williams & Co., J. H.
Williams, Wm. E.

CLASSIFICATION ASSOCIATION
American Bureau of Shipping.

CLEATS
Penn Seaboard Steel Corp.

CLINCH RINGS
Malleable Iron Fittings Co.
Williams, Wm. E.

CLOCKS
American Steam Gauge & Valve Mfg. Co.
Ashton Valve Co.
Chelsea Clock Co.
Hand, John E., & Sons Co.
Williams, Wm. E.

COAL-HANDLING MACHINERY
Lidgerwood Manufacturing Co.
McMyler Interstate Co.
Maine Electric Co.
Mundy, J. S., Hoisting Eng. Co.
National Hoisting Engine Co.
Shepard Elec. Crane & Hoist Co.

COATINGS
(See Anti-Rust Coatings.)

COCKS
(See Gauge Cocks.)

COLD SAWS
Ryerson, Jos. T., & Son.

COMBINED AIR AND CIRCULATING PUMPS
Dean Bros. Steam Pump Works.
Wheeler Manufacturing Co.

COMPANION FLANGES
Crane Co., The.
Lunkenheimer Co., The.
Powell Co., The William.
Williams Valve Co., D. T.
Williams, Wm. E.

COMPASSES
Hand, John E., & Son Co.
Sperry Gyroscope Co.
Williams, Wm. E.

COMPOSITIONS
(See Ship's Compositions.)

COMPOUNDS
(See Boiler Compounds.)

COMPRESSION RIVETERS
(See Power Riveters.)

CONDENSERS
Alberger Pump & Condenser Co.
American Engineering Co.
Bath Iron Works.
Consolidated Shipbuilding Corp.
Davidson Co., M. T.
Dean Bros. Steam Pump Works.
Fletcher Co., W. & A.
Griscom-Russell Co.
Ingersoll-Rand Co.
Kearfott Engineering Co.
National Marine Engine Works.
Ross Heater & Mfg. Co.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.
Westinghouse Electric & Mfg. Co.
Wheeler Condenser & Eng. Co.
Wheeler Mfg. Co., C. H.
Williams, Wm. E.
Worthington Pump & Mach. Corp.

CONDENSER TUBES
Chase Metal Works.
Chase Rolling Mill Co.
Kearfott Engineering Co.
Wheeler Condenser & Eng. Co.
Williams, Wm. E.

CONDUIT BOXES
Seidler-Miner Co.

CONDUIT FITTINGS
Chicago Fuse Mfg. Co.
Crouse-Hinds Co.

CONNECTING RODS
Heppenstall Forge & Knife Co.
Pollak Steel Co.
Williams & Co., J. H.

CONSULTING ENGINEERS
(See Engineers, Consulting.)

CONVEYING MACHINERY
Lidgerwood Manufacturing Co.
McMyler Interstate Co.
Maine Electric Co.
Manning, Maxwell & Moore, Inc.
Mead-Morrison Mfg. Co.
Mundy, J. S., Hoisting Eng. Co.
National Hoisting Engine Co.
O'Rourke Crane & Eng. Co.

CONVEYORS (COAL)
(See Conveying Machinery.)

CO^2 ICE MACHINES
(See Carbon Dioxide Machines.)

COOLERS—OIL COPPERS
(See Oil Coolers.)

COPPER
(See Brass and Copper.)

COPPER PAINT FOR WOODEN VESSELS
International Compositions Co.

COPPER TUBES, RODS, WIRES
Chase Metal Works.
Chase Rolling Mill Co.
Standard Underground Cable Co.
Williams, Wm. E.

CORDAGE
(Also see Rope and Wire Rope; also Twine.)
Ajax Rope Co.
American Manufacturing Co.
Columbian Rope Co.
Durable Wire Rope Co.
Griscom-Russell Co.
Plymouth Cordage Co.
Samson Cordage Works.
Waterbury Co.
Whitlock Cordage Co.
Williams, Wm. E.

CORK CEMENT
Ferdinand, L. W., & Co.

CORRUGATED FURNACES
American Spiral Pipe Works.
Continental Iron Works, The.
Howden, James, & Co.
Ryerson, Jos. T., & Son.

COUNTERS
(See Revolution Counters.)
Cory, Chas., & Son, Inc.

COUNTERSINKS
Rich Tool Co.
Standard Tool Co.

COUPLINGS
(See Hose Couplings.)

COVERINGS — NON-CONDUCTING
(See Non-conducting Coverings.)

COWLS
Ohio Body & Blower Co.
Stevens-Aylsworth Co., Inc.

CRANES
(Also see Floating Cranes and Shipyards Whirlers.)
American Balsa Co.
American Engineering Co.
Brown Hoisting Machinery Co.
Chambersburg Engineering Co.
Chisholm-Moore Mfg. Co.
McMyler Interstate Co.
Maine Electric Co.
Manning, Maxwell & Moore, Inc.
Mead-Morrison Mfg. Co.
Niles-Bement-Pond Co.
Pawling & Harnischfeger Co.
Shepard Elec. Crane & Hoist Co.
Sprague Electric Works.
Whiting Foundry Equip. Co.

CRANK SHAFTS
Pollak Steel Co.
Williams & Co., J. H.

CREOSOTED WOOD BLOCKS, LUMBER, TIMBERS, PILING, DECKING
Long-Bell Lumber Co.

CUT NAILS..
Malleable Iron Fittings Co.
Reading Iron Co.

CUTTERS
Pratt & Whitney Co.
Standard Tool Co.
Waycott, A. W.
Williams, Wm. E.

CUTTING COMPOUNDS
Texas Co., The.
Williams, Wm. E.

CUTTING & WELDING
(See Welding.)

CYLINDER BORING BARS
Niles-Bement-Pond Co.
Williams & Co., J. H.

CYLINDER RELIEF VALVES
(See Valves.)

CYLINDERS FOR COMPRESSED AIR, GAS, ETC.
Continental Iron Works, The.
National Tube Co.

DAVITS
American Balsa Co.
Morse Dry Dock & Repair Co.
Steward Davit & Equip. Corp.

DECK FITTINGS
Penn Seaboard Steel Corp.
Stevens-Aylsworth Co., Inc.
Steward Davit & Equip. Corp.
Thacher Propeller & Foundry Corp.
Williams, Wm. E.

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DECK PLATES
Harvey Co., Arthur C.
Sands & Son, A. B.
Williams, Wm. E.

DECK PUMPS
Dean Bros. Steam Pump Works.
Sands & Son Co., A. B.
Williams, Wm. E.

DECKING
Marine Decking & Supply Co.

DEPTH RECORDERS
Hand, J. E., & Sons Co.

DERRICKS
Lidgerwood Manufacturing Co.
McMyler Interstate Co.
Maine Electric Co.

DERRICK CARS
McMyler Interstate Co.
Maine Electric Co.

DERRICK IRONS
Lidgerwood Manufacturing Co.

DETACHING GEAR (BOAT)
American Balsa Co.
Morse Dry Dock & Repair Co.
Steward Davit & Equip. Corp.

DIAPHRAGM PUMPS
Hyde Windlass Co.

DIE BLOCKS
Heppenstall Forge & Knife Co.
Pollak Steel Co.
Ryerson, Jos. T., & Son.

DIES
Brubaker & Bros., W. L.
Cleveland Punch & Shear Works Co.
Ryerson, Jos. T., & Son.
Williams, Wm. E.

DIESEL ENGINES
(Also see Engines, Oil.)
Cramp, Wm., & Sons Ship & Engine Bldg. Co.
Hadfield-Penfield Steel Co.
Johannsen, H. S.
Kearfott Engineering Co.
McIntosh & Seymour Corp.
New London Ship & Engine Co.
Western Machinery Co.
Winton Engine Works.
Worthington Pump & Mach. Corp.

DIRECT-CONNECTED SETS
(See Electrical Plants.)

DIRECTION AND REVOLUTION INDICATORS
Cory, Chas., & Son, Inc.

DISENGAGING GEARS
American Balsa Co.
Steward Davit & Equip. Corp.

DISTILLERS
(See Evaporators.)

DIVING APPARATUS
Morse, Andrew J., & Son, Inc.

DOCK FITTINGS
Thacher Propeller & Foundry Corp.
Williams, Wm. E.

DRAFT GAUGES
Pneumercator Co.
Williams, Wm. E.

DRAFTING INSTRUMENTS
New York Blue Print Paper Co.
Starrett, L. S., Co.

DRAIN VALVES
(See Valves.)

DRAWING MATERIALS
(Board, Cloth, Paper, Ink, Etc.)
National Tracing Cloth Co.
New York Blue Print Paper Co.
Starrett Co., L. S.

DRAWING PENCILS
American Lead Pencil Co.
Dixon Crucible Co.

DRAFTING ROOM FURNITURE
New York Blue Print Paper Co.

DREDGES
Morris Machine Works.

DREDGING MACHINERY
Alberger Pump & Condenser Co.
American Engineering Co.
Fletcher Co., W. & A.
Flory Manufacturing Co.
Lidgerwood Manufacturing Co.
McMyler Interstate Co.
Morris Machine Works.
Mundy Hoisting Engine Co., J. S.
National Marine Engine Works.

DREDGING PUMPS
Morris Machine Works.
National Marine Engine Works.
Terry Steam Turbine Co.
Worthington Pump & Mach. Corp.

DRIFT PINS
Cleveland Punch & Shear Works Co.
Williams, Wm. E.

DRILLING MACHINES
Lynd-Farquhar Co.
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

DRILLS
Pratt & Whitney Co.
Rich Tool Co.
Standard Tool Co.
Williams, Wm. E.

DRILLS, ELECTRIC
(See Electric Drills.)

DRILLS, PNEUMATIC
(See Pneumatic Tools.)

DRILLS, PORTABLE
(See Portable Drills.)

DRILLS, WALL RADIAL
(See Radial Drills.)

DROP FORGINGS
(Eye Bolts, Wrenches, Etc.)
Mesta Machine Co.
Pollak Steel Co.
U. S. Chain & Forging Co.
Williams & Co., J. H.
Williams, Wm. E.

DROP HAMMERS
Chambersburg Engineering Co.
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

DRY DOCK PUMPS
Cameron Steam Pump Wks., A. S.
Morris Machine Works.
Worthington Pump & Mach. Corp.

DRY DOCKS
(Manufacturer and Marine Railways.)
Crandall Engineering Co.

DRY DOCKS AND MARINE RAILWAYS
Baltimore Dry Docks & Shipbuilding Co.
Bethlehem Shipbuild'g Corp. Ltd.
Charleston Dry Dock & Machine Co.
Cramp, Wm., & Sons Ship & Engine Bldg. Co.
Merchant Shipbuilding Corp.
Morse Dry Dock & Repair Co.
Newport News Shipbuilding & Dry Dock Co.
Staten Island Shipbuilding Co.
Todd Shipyards Corp.
Union Dry Dock & Repair Co.

DYNAMOS
See Electric Plants.)

ECCENTRIC RODS
Pollak Steel Co.

ECONOMIZERS, FUEL
(See Fuel Economiser.)

EJECTORS
Lunkenheimer Co.
Schutte & Koerting Co.
Williams, Wm. E.

ELECTRIC CRANES
(See Electric Hoists.)

ELECTRIC CUTOUTS
Chicago Fuse Mfg. Co.
Conlan Electric Corp.
Crouse-Hinds Co.
Seidler-Miner Co., Inc.

ELECTRIC DRILLS AND GRINDERS
Chicago Pneumatic Tool Co.
Cincinnati Electrical Tool Co.
General Electric Co.
Independent Pneumatic Tool Co.
United States Electrical Tool Co.
Williams, Wm. E.

ELECTRIC DRIVEN PUMPS
Cameron Steam Pump Wks, A. S.
Dean Bros. Steam Pump Works.
Fairbanks, Morse & Co.
Kinney Manufacturing Co.

ELECTRIC FREIGHT TRUCKS
(See Freight-Handling.)

ELECTRIC HEATERS
American Car & Foundry Co.
Cory, Chas., & Son, Inc.
General Electric Co.

ELECTRIC HOISTS
Allan-Cunningham Co.
American Engineering Co.
Brown Hoisting Machinery Co.
Chicago Pneumatic Tool Co.
Dake Engine Co.
General Electric Co.
Hyde Windlass Co.
Lidgerwood Manufacturing Co.
Maine Electric Co.
Maritime Engineering & Sales Corp.
Mead-Morrison Mfg. Co.
Mundy Hoisting Eng. Co., J. S.
National Hoisting Engine Co.
Niles-Bement-Pond Co.
Shepard Elec. Crane & Hoist Co.
Western Electric Co.

ELECTRIC LIGHTING
Benjamin Electric Mfg. Co.
Conlan Electric Corp.
Cory, Chas., & Son, Inc.
Crouse-Hinds Co.
General Electric Co.
Morse Dry Dock & Repair Co.
Seidler-Miner Co., Inc.
Western Electric Co.

ELECTRIC METERS
(See Meters, Electric.)

ELECTRIC PLANTS
Benjamin Electric Mfg. Co.
Conlan Electric Co.
Consolidated Shipbuilding Corp.
Cory, Chas., & Son, Inc.
Fairbanks, Morse & Co.
General Electric Co.
Mietz Corporation.
Seidler-Miner Co., Inc.
Terry Steam Turbine Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.

ELECTRIC PUMPS
(See Electric Driven Pumps.)

ELECTRIC SIGNALS
Cory, Chas., & Son, Inc.
Seidler-Miner Co., Inc.

ELECTRIC TACHOMETERS
Cory, Chas., & Son, Inc.
Seidler-Miner Co., Inc.

ELECTRIC WELDING
(See Welding, Electric.)

ELECTRICAL APPLIANCES, INSTALLATIONS, FITTINGS AND SUPPLIES
Benjamin Electric Mfg. Co.
Chicago Fuse Mfg. Co.
Cory, Chas., & Son, Inc.
Crouse-Hinds Co.
General Electric Co.
Seidler-Miner Co., Inc.
Western Electric Co.
Williams, Wm. E.

ELECTRICAL INSTRUMENTS
Conlan Electric Co.
Cory, Chas., & Son, Inc.
General Electric Co.
Seidler-Miner Co., Inc.
Western Electric Co.
Weston Electrical Instrument Co.
Williams, Wm. E.

ELECTRIC WIRE COVERINGS
Tubular Woven Fabric Co.

ELECTRICAL WIRING DEVICES
(Switches, Sockets, Etc.)
Benjamin Electric Mfg. Co.
Conlan Electric Co.
Cory, Chas., & Son, Inc.
Seidler-Miner Co., Inc.
Western Electric Co.
Williams, Wm. E.

ELEVATORS, AIR AND HYDRAULIC
(Also see Portable Eelevators.)
Whiting Foundry Equipment Co.

ENGINE LOGS
Cory, Chas., & Son, Inc.
Williams, Wm. E.

ENGINE OIL
(See Lubricants.)

ENGINE PACKING
(See Packing.)

ENGINE ROOM COUNTERS
(See Revolution Counters.)

ENGINE ROOM TELEGRAPHS
Cory, Chas., & Son, Inc.

ENGINEERS, CONSULTING—MARINE
American Engineering Co.
American Ship Building Co.
Benjamin Electric Mfg. Co.
Bogert, J. L.
Bonner, William T.
Chapman & Fisher.
Cox & Stevens.
Crandall Engineering Co.
Donnelly, W. T.
Ferris, Theodore.
Haight, Robert S.
Max Hansen.
Harris, Leonard B.
Hough, Edward S.
Howden & Co., Ltd.
Leslie Stevens Co.
Lysholm, Henry, Inc.
Matthews, John B.
McClelland & Co., N. E., Ltd.
McKinlay, James.
McNab Co., The.
Morse Drn Dock & Repair Co.
Nilson, Leonard J.
Reid & Co., John.
Ross Heater & Mfg. Co.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.
Union Dry Dock & Repair Co.
Watts, J. Murray.

ENGINEERS, ELECTRICAL
Cory, Chas., & Son, Inc.

ENGINES FOR AUXILIARIES
Alberger Pump & Condenser Co.
Bolinders Co.
Consolidated Shipbuilding Corp.
De Laval Steam Turbine Co.
Fairbanks, Morse & Co.
Howden & Co.
Hyde Windlass Co.
Johannsen, H. S.
Kearfott Engineering Co.
McIntosh & Seymour Corp.
Maine Electric Co.
Mietz Corporation, August.
Morris Machine Works.
New London Ship & Engine Co.
Reid & Co., John.
Skandia Oil Engines.
Terry Steam Turbine Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
Worthington Pump & Mach. Corp.

ENGINES, GASOLINE
(See Gasoline Engines.)

ENGINES, HOISTING
(See Hoisting Engines.)

ENGINES, KEROSENE
(See Kerosene Engines.)

ENGINES, OIL
(Also see Diesel Engines.)
Bolinders Co.
Chicago Pneumatic Tool Co.
Consolidated Shipbuilding Corp.
Fairbanks, Morse & Co.
Hadfield-Penfield Steel Co.
Ingersoll-Rand Co.
Johannsen, H. S.
Kearfott Engineering Co.
McIntosh & Seymour Corp.
Mietz Corporation, August.
Morse Dry Dock & Repair Co.
New London Ship & Engine Co.
Skandia Oil Engines.
Standard Motor Construction Co.
Western Machinery Co.
Winton Engine Co.
Worthington Pump & Mach. Corp.

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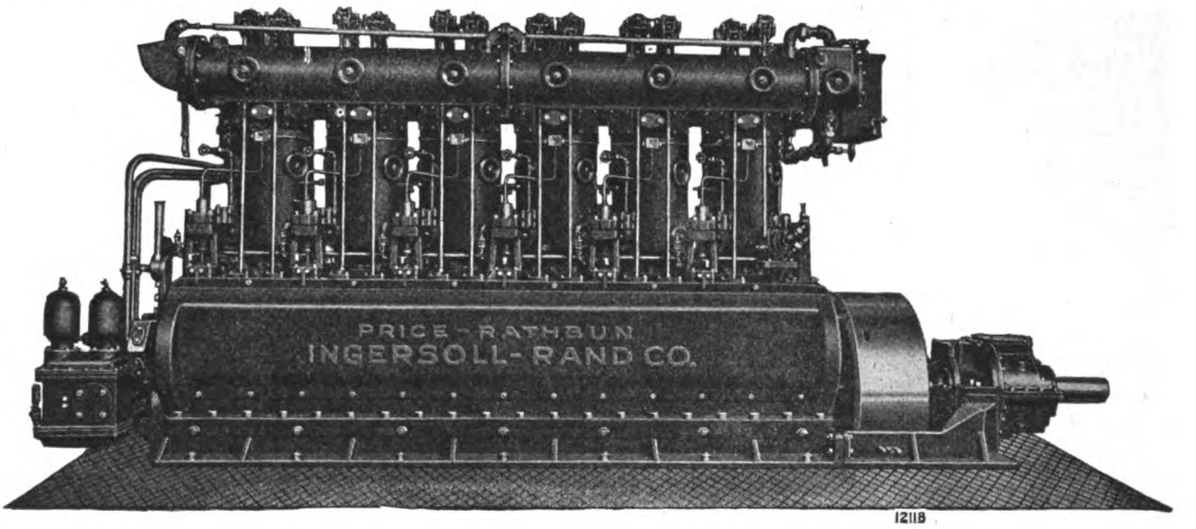
Marine Oil Engines



Economy Plus Simplicity

With our low compression direct injection system 0.45 pounds of fuel per shaft horse power hour can be conservatively guaranteed.

Our highly developed full pressure lubricating system permits of the use of one lubricant for both bearings and pistons and a total lubricating oil consumption of less than one-third of a gallon per 1000 horse power hours.

Consider the simplicity of a four cycle oil engine having low cylinder compression, sprayers of fundamental simplicity, requiring no injection air compressor, no air pipes or air bottles, and with a positive reversing system consisting of a single sliding cam.

In this intensive design of reversible oil engine, internal combustion has been raised to as high a plane of dependability and flexibility as is possible even with the use of steam.

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Ingersoll-Rand

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ENGINES, PROPELLING
American Ship Building Co.
Ames Shipbuilding & Dry Dock Co.
Badenhausen Co.
Bath Iron Works.
Bethlehem Shipbuilding Corp.
Bolinders Co.
Consolidated Shipbuilding Corp.
Cramp & Sons, Wm., Ship & Engine Bldg. Co.
Fairbanks, Morse & Co.
Fletcher Co., W. & A.
Hadfield-Penfield Steel Co.
Hardie-Tynes Mfg. Co.
Hooven, Owens, Rentschler Co.
Howden & Co., James.
Ingersoll-Rand Co.
Johannsen, H. S.
Kearfott Engineering Co.
Los Angeles Shipbuilding & Dry Dock Co.
McIntosh & Seymour Corp.
Mietz Corporation, August.
Morris Machine Works.
Morse Dry Dock & Repair Co.
National Marine Engine Works.
New London Ship & Engine Co.
Parsons Marine Steam Turbine Co.
Reid & Co., John.
Skandia Oil Engine.
Standard Motor Construction Co.
Staten Island Shipbuilding Co.
Trout Co., H. G.
Vulcan Irin Works, Inc.
Ward, Chas., Engineering Works.
Winton Engine Co.
Worthington Pump & Machinery Corp.

ENGINES, PUMPING
Alberger Pump & Condenser Co.
Davidson Co., M. T.
Fairbanks, Morse & Co.
Griscom-Russell Co.
Hush, H. J.
Kearfott Engineering Co.
Morris Machine Works.
Row & Davis, Engineers, Inc.
Terry Steam Turbine Co.
Worthington Pump & Mach. Corp.

ENGINE-ROOM CLOCKS
(See Clocks.)

ENGINE ROOM GRATINGS
Irving Iron Works Co.

ENGINE-ROOM SUPPLIES
(See Steam Specialties.)

ENGINE ROOM TELEGRAPHS
Chadburn (Ship) Telegraph Co.
McNab Co., The.
Williams, Wm. E.

ERASERS
Dixon Crucible Co., Joseph.
New York Blue Print Paper Co.

EVAPORATORS
Alberger Pump & Condenser Co.
American Engineering Co.
Davidson Co., M. T.
Griscom-Russell Co.
Kerfott Engineering Co.
Ross Heater & Mfg. Co.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.
Williams, Wm. E.

EXHAUST FANS
(See Blowers.)

EXPANDERS
(See Boiler Flue Expanders and Pipe Expanding and Flanging Machines.)

EXPANSION JOINTS
Alberger Pump & Condenser Co.
Crane Co., The.
Griscom-Russell Co.
Lunkenheimer Co.
Powell Co., The William.
Ross Heater & Mfg. Co.

EYE BOLTS
Williams & Co., J. H.
Williams, Wm. E.

FAIRLEADERS
Thacher Propeller & Foundry Corp.

FANS
(See Blowers.)

FEED WATER HEATERS
Chaplin-Fulton Mfg. Co.
Griscom-Russell Co.
Kearfott Engineering Co.
Pratt & Cady Co., Inc.
Ross Heater & Mfg. Co.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.
Williams, Wm. E.
Worthington Pump & Machinery Corp.

FEED WATER REGULATORS
Alberger Pump & Condenser Co.
Chaplin-Fulton Mfg. Co.
Jerguson Gage & Valve Co.
Kearfott Engineering Co.
Pratt & Cady Co., Inc.

FENCES
(See Wire Fences.)

FERRULES—CONDENSER TUBE
(See Condenser Tube Ferrules.)

FILES
Nicholson File Co.
Williams, Wm. E.

FILLING STATION EQUIPMENT
Wayne Oil Tank & Pump Co.

FILTERS—MARINE OIL
Griscom-Russell Co.
Kearfott Engineering Co.
Ross Heater & Mfg. Co.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.
Williams, Wm. E.

FIRE ALARM SYSTEMS
Cory, Charles & Son, Inc.
Fire Detecting Wire Co.
Kidde Co., Inc., Walter.

FIRE DEPARTMENT SUPPLIES
Foamite Firefoam Co.
Morse, Andrew J., & Son, Inc.

FIRE DEPARTMENT SUPPLIES
Kidde Co., Inc., Walter.

FIRE EXTINGUISHERS
Kidde Co., Inc., Walter.
Morse, Andrew J., & Son, Inc.
Schutte & Koerting Co.
Williams, Wm. E.

FIRE HOSE
(See Hose.)

FIREPROOF LUMBER
(See Lumber, Fireproof.)

FIRE PUMPS
Dean Bros. Steam Pump Works.
Morris Machine Works.
Worthington Pump & Mach. Corp.

FLAGS & PENNANTS
Granger, George B., Co.
Williams, Wm. E.

FLANGED BOILER HEADS
Lukens Steel Co.
Ryerson, Jos. T., & Son.

FLANGES
American Spiral Pipe Works.
Crane Co., The.
Dart, E. M., Mfg. Co.
Lunkenheimer Co., The.
Penn Seaboard Steel Corp.
Ryerson, Jos. T., & Son.
Williams Valve Co., D. T.
Williams, Wm. E.

FLANGING MACHINES
Chambersburg Engineering Co.
McCabe Manufacturing Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

FLEXIBLE CORDS AND CABLES
Tubular Woven Fabric Co.

FLOATING CRANES
(Also see Cranes.)
McMyler-Interstate Co.
Maine Electric Co.

FLOAT VALVES
Crane Co., The.
Lunkenheimer Co., The.
Mason Regulator Co.

FLOATING DRY DOCKS
(See Dry Docks.)

FLOATING DRY DOCK CABLES
Habirshaw Electric Cable Co.

FLOOR GRATINGS
Irving Iron Works Co.

FLOOR PLATES
Crane Co., The.
Harvey, Arthur C., Co.
Ryerson, Jos. T., & Son.

FLUE CLEANERS
(See Boiler Flue Cleaners.)

FLUE CUTTERS
(See Boiler Flue Cutters.)

FLUE HOLE PUNCHES AND DIES
Cleveland Punch & Shear Works Co.

FLUE RATTLERS
Baird Pneumatic Tool Co.

FOG HORNS
Cory, Chas., & Son, Inc.
Hand, John E., & Sons Co.
Williams, Wm. E.

FOLDING ANCHORS
Malleable Iron Fittings Co.

FORCED DRAFT
(See also Blowers.)
De Laval Steam Turbine Co.
General Electric Co.
Howden, James, & Co.
Kearfott Engineering Co.
Reid & Co., John,
Terry Steam Turbine Co.

FORGES
Baird Pneumatic Tool Co.
Baush Machine Tool Co.
Buffalo Forge Co.

FORGINGS, BRONZE
Camden Forge Co.
Hyde Windlass Co.
Pollak Steel Co.
Stevens-Aylsworth Co., Inc.

FORGINGS—DROP
(See Drop Forgings.)

FORGINGS, IRON AND STEEL
(Also see Drop Forgings.)
Baldt Anchor Co.
Camden Forge Co.
Charleston Dry Dock & Machine Co.
Heppenstall Forge & Knife Co.
Mesta Machine Co.
Morse Dry Dock & Repair Co.
Pollak Steel Co.
Stevens-Aylsworth Co., Inc.
Thacher Propeller & Foundry Corp.

FORGINGS—MONEL METAL
International Nickel Co.

FOUNDRY EQUIPMENT
Whiting Foundry Equipment Co.

FREIGHT-HANDLING EQUIPMENT
Brown Hoisting Machinery Co.
Chisholm-Moore Mfg. Co.
General Electric Co.
Lidgerwood Manufacturing Co.
McMyler Interstate Co.
Maine Electric Co.
Manning, Maxwell & Moore, Inc.
Mead-Morrison Mfg. Co.
Mundy, J. S., Hoisting Engine Co.
National Hoisting Engine Co.
Sheppard Elec. Crane & Hoist Co.
Sprague Electric Works.
Towmotor Co., The.
Western Electric Co.

FREIGHT TRUCKS
Packard Motor Car Co.
Towmotor Co., The.

FRICTION SAWS
Ryerson, Jos. T., & Son.

FROST PROOF COVERINGS
Ferdinand, L. W., & Co.

FUEL ECONOMIZERS
Griscom-Russell Co.
Magnesia Association of America.

FUEL OIL
Sun Co.
Texas Co., The.

FUEL OIL ATOMIZERS
Schutte & Koerting Co.

FUEL OIL BURNERS
Baush Machine Tool Co.
Schuette & Koerting Co.
White Fuel Oil Engineering Corp.
Williams, Wm. E.

FUEL OIL HEATERS
Griscom-Russell Co.
Ross Heater & Mfg. Co.
Williams, Wm. E.

FURNACE BRIDGE WALLS
Wager Furnace Bridge Wall Co., Inc.

FURNACE CEMENT
Waycott, A. K.

FURNACE FRONTS
Continental Iron Works, The.
Fletcher Co., W. & A.
Howden & Co., James.
Reid & Co., John.

FURNACES
(Also see Oil Furnaces.)
American Car & Foundry Co.
American Spiral Pipe Works.
Baird Pneumatic Tool Co.
Continental Iron Works, The.
Wayne Oil Tank & Pump Co.

FUSES
Chicago Fuse Mfg. Co.
Crouse-Hinds Co.

FUSIBLE PLUGS
Crane Co., The.
Griscom-Russell Co.
Lunkenheimer Co., The.
Williams Valve Co., D. T.
Williams, Wm. E.

GALLEY PUMPS
Mott Iron Works, J. L.
Sands & Son, Co., A. B.
Williams, Wm. E.

GALLEYS
(See Ranges.)

GALVANIZED MATERIAL
Sands, A. B., & Son Co.
Tiebout, W. & J.
Williams, Wm. E.

GANTRY CRANES
Niles-Bement-Pond Co.

GAS COMPRESSORS
Norwalk Iron Works.

GAS ENGINE SPECIALTIES
Crane Co., The.
Lunkenheimer Co., The.
Powell Co., The William..
Pratt & Cady Co., Inc.
Schutte & Koerting Co.
Williams Valve Co., D. T.

GASKETS
(Also see Packing.)
Crane Co., The.
Goetze Gasket & Packing Co.
Goodrich Rubber Co., B. F.
Griscom-Russell Co.
New York Belting & Packing Co.
Smooth-On Manufacturing Co.
United States Rubber Co.
Williams, Wm. E.

GASOLINE
Texas Co., The.

GASOLINE ENGINES
Consolidated Shipbuilding Corp.
Fairbanks, Morse & Co.
Hush, H. J.
Standard Motor Construction Co.
Winton Engine Co.

GASOLINE PUMPS
Sands & Son Co., A. B.
Worthington Pump & Machinery Corp.

GATE VALVES—BRASS AND IRON
Crane Co., The.
Lunkenheimer Co., The.
Powell Co., The William.
Pratt & Cady, Inc.
Schutte & Koerting Co.
Williams Valve Co., D. T.
Williams, Wm. E.

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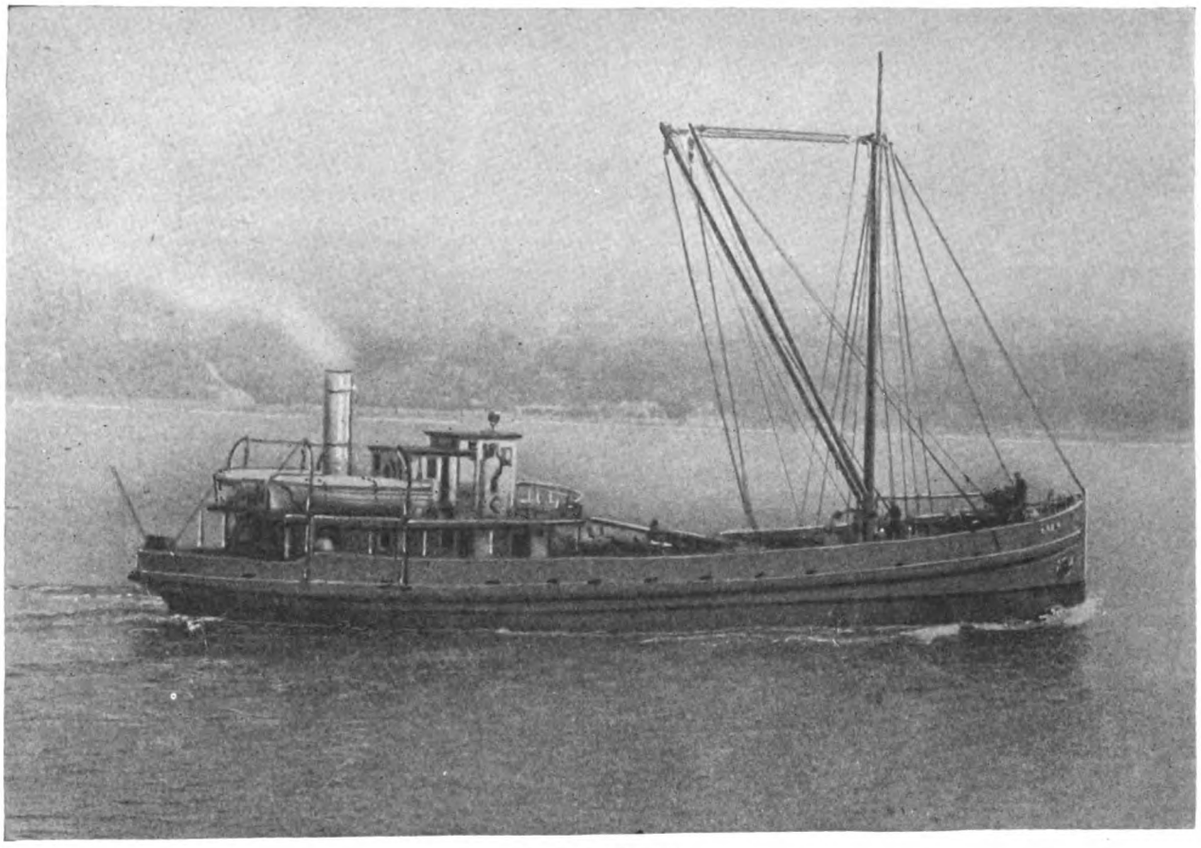
BOLINDERS



M/V "TECO"

Equipped with one 160 B. H. P. Bolinder Engine
125′ long, 23′ beam, 300 tons carrying capacity, speed loaded 8 knots

The "Teco" is a vessel of a type that is most efficient and economical for carrying freight on the Inland Water Ways.

The Inland Water Ways have lately come into prominence as never before. The supply of cargoes for their traffic is inexhaustible.

The owners of the "Teco", the Taylor Engineering Company, Limited, of Vancouver, B. C., inform that the operating expenses are

8½ CENTS A MILE ONLY

If you have money available why not invest it in a vessel like the "Teco"; you will then have a steady and large income on your capital.

The "Teco" can be duplicated. Let us show you the facts. Our services are always at your disposal.

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Compañia Bolinder
560 Avenida de Mayo
Buenos Aires, Argentina

Lombard & Co.
9 O'Reilly, Havana, Cuba

REPRESENTATIVES:

Henry Lund & Co.
Marine Building
San Francisco, Cal.

Swedish Steel & Importing Co.
Shaughnessy Building
Montreal, Canada

Menge Marine Hardware & Supply Co.
New Orleans, La.

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GATE VALVES FOR TANK STEAMERS
Pratt & Cady Co., Inc.
Williams, Wm. E.

GAUGE COCKS
American Steam Gauge & Valve Mfg. Co.
Jerguson Gage & Valve Co.
Lunkenheimer Co., The.
Powell Co., The William.
Pratt & Cady Co., Inc.
Sands & Son Co., A. B.
Williams Valve Co., D. T.
Williams, Wm. E.

GAUGE GLASSES
Crane Co., The.
Jerguson Gage & Valve Co.
Lunkenheimer Co., The.
Powell Co., The William.
Williams Valve Co., D. T.
Williams, Wm. E.

GAUGES
(See Draft Gauges; also Tank Gauges.)

GAUGES—MANUFACTURERS'
(Also see Steam Gauges.)
Manning, Maxwell & Moore, Inc.
Pratt & Whitney Co.
Starrett Co., L. S.

GAUGE TESTERS
American Steam Gauge & Valve Mfg. Co.

GEARS
De Laval Steam Turbine Co.
Falk Co., The.
Penn Seaboard Steel Corp.
Westinghouse Electric & Mfg. Co.

GENERAL WELDING AND CUTTING EQUIPMENT
(See Welding & Cutting Apparatus and Supplies.)

GENERATING SETS
Fairbanks, Morse & Co.
General Electric Co.
Mietz Corporation.
Terry Steam Turbine Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
Williams, Wm. E.

GENERATORS
Benjamin Electric Mfg. Co.
Crouse-Hinds Co.
Fairbanks, Morse & Co.
General Electric Co.
Western Electric Co.
Williams, Wm. E.

GLOBE VALVES—BRASS AND IRON
Crane Co., The.
Lunkenheimer Co., The.
Powell Co., The William.
Pratt & Cady Co., Inc.
Schutte & Koerting, Inc.
Williams Valve Co., D. T.
Williams, Wm. E.

GLUE—MARINE
American Glue Co.
Ferdinand & Co., L. W.
Williams, Wm. E.

GOVERNOR VALVES
Crane Co., The.
Lunkenheimer Co., The.
Schutte & Koerting Co.
Union Water Meter Co.
Williams, Wm. E.

GOVERNORS
Cory, Chas., & Son, Inc.

GRAB BUCKETS
Mead-Morrison Mfg. Co.

GRAPHITE
Dixon Crucible Co., Jos.

GRATINGS—FOR ENGINE ROOM FLOORS, ETC.
Irving Iron Works Co.

GREASE
(See Lubricants.)

GREASE CUPS
Crane Co., The.
Lunkenheimer Co., The.
Powell Co., The William.
Sun Co.
Waterbury Mfg. Co.
Williams Valve Co., D. T.

GREASE EXTRACTORS
American Steam Gauge & Valve Mfg. Co.
Griscom-Russell Co.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.
Williams, Wm. E.

GRINDERS—ELECTRIC AND PNEUMATIC
Chicago Pneumatic Tool Co.
Independent Pneumatic Tool Co.
Keller Pneumatic Tool Co.
United States Electrical Tool Co.
Western Electric Co.

GRINDING MACHINES
(Plain and Universal.)
Ryerson, Jos. T., & Son.

GUILLOTINE SHEARS
Cleveland Punch & Shear Works Co.
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

GUY ANCHORS
Crouse-Hinds Co.

GYPSEYS
American Engineering Co.
Hyde Windlass Co.
Lidgerwood Mfg. Co.
Maine Electric Co.
Mundy Hoisting Engine Co., J. S.

GYRO-COMPASSES
Sperry Gyroscope Co.

GYRO-STABILIZER
Sperry Gyroscope Co.

HACK SAWS
Goodell-Pratt Co.
L. S. Starrett Co.

HAMMERS
Bradley & Son, C. C.
Nazel Engineering & Mach. Co.

HAMMERS, PNEUMATIC
(See Pneumatic Tools.)

HAMMERS, STEAM
Chambersburg Eng. Works.
Nazel Engineering & Mach. Co.
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

HAMMOCKS
(See Couch Hammocks.)

HANDLES (CRANK, BALANCE, MACHINE)
Williams & Co., J. H.

HARDWARE
(See Marine Hardware.)

HARDWOOD
(See Lumber.)

HAWSER REELS
Thacher Propeller & Foundry Corp.
Williams, Wm. E.

HAWSERS—MANILA
(Also see Rope and Wire Rope.)
American Mfg. Co.
Columbian Rope Co.
Plymouth Cordage Co.
Waterbury Co., The.
Whitlock Cordage Co.
Williams, William E.

HEAT INSULATION
(Also see Non-Conducting Coverings.)
American Balsa Co.
Magnesia Association of America.

HEATERS
(Bath, Lavotory, Shower.)
Alberger Pump & Condenser Co.
Griscom-Russell Co.
Kearfott Engineering Co.
Mott Iron Works, J. L.
Pratt & Cady Co., Inc.
Ross Heater & Mfg. Co.
Sands & Son Co., A. B.
Schutte & Koerting Co.
Williams, Wm. E.

HEMP
(See Twine.)

HOIST HOOKS
Williams, J. H., & Co.
Williams, Wm. E.

HOISTING ENGINES
Allan-Cunningham Co.
American Engineering Co.
Dake Engine Co.
Fairbanks, Morse & Co.
Flory Manufacturing Co., S.
Hadfield-Penfield Steel Co.
Hush, H. J.
Hyde Windlass Co.
Lidgerwood Mfg. Co.
Maine Electric Co.
Maritime Engineering & Sales Corp.
Mead-Morrison Mfg. Co.
Mundy Hoisting Engine Co., J. S.
National Hoisting Engine Co.

HOISTING AND TRANSMISSION ROPE
(See Rope.)

HOISTS, CHAIN
(See Chain Hoists.)

HOISTS, ELECTRIC
(See Electric Hoists.)

HOLDERS-ON
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Keller Pneumatic Tool Co.

HOLLOW BORING
Pollak Steel Co.

HORIZONTAL PUNCHES
Cleveland Punch & Shear Works Co.

HOSE
(Also see Air Hose.)
Chicago Pneumatic Tool Co.
Goodrich Rubber Co., B. F.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Keller Pneumatic Tool Co.
New York Belting & Packing Co.
Oldham & Son Co., George.

HOSE COUPLING
Chicago Pneumatic Tool Co.
Cleveland Pneumatic Tool Co.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Keller Pneumatic Tool Co.
Oldham & Son Co., George.

HOSE NOZZLES
Morse, Andrew J., Sons, Inc.

HUMIDIFIERS
Griscom-Russell Co.
Schutte & Koerting Co.

HYDRAULIC FITTINGS
Crane Co., The.
Lunkenheimer Co.
Penn Seaboard Steel Corp.
Powell Co., The William.
Watson-Stillman Co.
Williams Valve Co., D. T.

HYDRAULIC PRESSES AND OTHER MACHINERY
Chambersburg Engineering Co.
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.
Watson-Stillman Co.

HYDROGEN
International Oxygen Co.

HYDROGEN GENERATORS
International Oxygen Co.

HYDROMETERS
Taylor Instrument Companies.

HYGRODEIKS
Taylor Instrument Companies.

HYGROMETERS
Taylor Instrument Companies.

ICE MACHINES
(See Refrigerating Machinery.)

INDICATOR CONNECTIONS
Lunkenheimer Co.
Powell Co., The William.

INDICATORS
(Steam and Gas Engine.)
American Steam Gauge & Valve Mfg. Co.
Ashton Valve Co.
Cory, Chas., & Son, Inc.
Lonkenheimer Co., The.
Manning, Maxwell & Moore, Inc.
Powell Co., The William.
Williams, Wm. E.

INDUSTRIAL ENGINEERS
Jacobs, J. L., & Co.

INJECTORS
Lunkenheimer Co., The.
Manning, Maxwell & Moore, Inc.
Powell Co., The William.
Schutte & Koerting Co.
Williams, Wm. E.

INSULATING COVERINGS
Tubular Woven Fabric Co.

INTERLOCKING RUBBER TILING
Griscom-Russell Co.
New York Belting & Packing Co.

IRON
Harvey, Arthur C., Co.

IRON CEMENT
Smooth-On Mfg. Co.

IRON PIPE
(See Pipe.)

JACKS
(Pneumatic.)
Gracey, R., & Sons Co.
Independent Pneumatic Tool Co.
Watson-Stillman Co.

JACKS, HYDRAULIC
Watson-Stillman Co.

JACKS-STEAMBOAT RATCHET
(Pulling.)
Gracey, R., & Sons Co.
Griscom-Russell Co.

JOURNAL BEARINGS
(See Thrust Bearings.)

JUTE
American Mfg. Co.
Columbian Rope Co.

KEROSENE ENGINES
Consolidated Shipbuilding Corp.
Fairbanks, Morse & Co.
Hush, H. J.
Mietz Machine Works.
Standard Motor Construction Co.
Winton Engine Works.

KNIFE SWITCHES
Crouse-Hinds Co.

LADDERS
Irving Iron Works Co.
Universal Safety Tread Co.

LADDER TREADS
Irving Iron Works Co.
Universal Safety Tread Co.
Williams, Wm. E.

LAMPS, SIGNALS AND FIXTURES
Cory, Chas., & Son, Inc.
General Electric Co.
Sands, A. B., & Son Co.
Seidler-Miner Co., Inc.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
Williams, Wm. E.

LATHE DOGS
Williams & Co., J. H.
Williams, Wm. E.

LATHES, CRANK SHAFT, ENGINE AND TURRET
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

LAUNCHES AND YACHTS
(See Shipbuilders.)

LAUNCHING GREASE
Sun Co.
Texas Co., The.

LAVATORIES
(Stateroom.)
Crane Co., The.
Mott Iron Works, J. L.
Sands, A. B., & Son Co.
Williams, Wm. E.

LAVATORY AND BATH HEATERS
Griscom-Russell Co.
Sands, A. B., & Son Co.
Williams, Wm. E.

LEAD PENCILS
(See Drawing Pencils.)

LEATHER BELTING
Williams, Wm. E.

LIFE BOATS AND RAFTS
American Balsa Co.
Lane Lifeboat Co., C. M.
Neptune Boat Works.
Pride, Guy R., & Son.
Steward Davit & Equip. Corp.
Williams, Wm. E.

LIFE PRESERVERS
American Balsa Co.
Ferdinand, L. W., & Co.
Williams, Wm. E.

LIFE-SAVING DEVICES
American Balsa Co.
Steward Davit & Equip. Corp.
Williams, Wm. E.

LIGHTING SETS
(See Electric Plants.)

LIGHTS, ELECTRIC
(See Electric Lights.)

LINES—TOWING, BUOY
(See Rope.)

LINOLEUM CEMENT
Ferdinand & Co., L. W.

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When Seconds Count

Somewhere, sometime, despite infinite precautions, an accident may occur—a crash in the fog, the confusion of darkness, the launching of lifeboats under conditions when seconds mean lives saved or lost.

Will the lifeboat system operate effectively? Can the davits, tackle and chock fittings be depended upon to save those seconds? Are the lifeboats seaworthy?

American Balsa Company equipment can be depended upon. It is designed to meet abnormal demands. It is available in combinations suitable for every installation requirement. It should be a part of your ships.

American Balsa Company *Inc.*

Welin Marine Department

50 East Forty-Second Street, New York

A most effective combination known as the Lundin Lifeboat System comprises Welin Davits and Lundin Decked Lifeboats, nested, with Mills' Gear, non-toppling blocks, tilting chocks, and appropriate gripe gear and boat covers.

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LIQUID GLUE, WATERPROOF
Ferdinand & Co., L. W.

LOADING AND UNLOADING EQUIPMENT
(See Freight-Handling Equipment.)

LOCKS AND LATCHES
(See Ship Locks and Latches.)

LOCOMOTIVE CRANES
(See Cranes.)

LOG REGISTERS
American Balsa Co.
Hand, John E., & Sons Co.

LOWERING CONTROL
American Balsa Co.
Morse Dry Dock & Repair Co.
Steward Davit & Equip. Corp.

LUBRICANTS
Cook's Sons, Adam.
Dixon Crucible Co., Jos.
Sun Co.
Texas Co., The.
Wadsworth, Howland & Co.
Williams, Wm. E.

LUBRICATING COMPOUND
Cook's Sons, Adam.

LUBRICATING STRAINERS
Schutte & Koerting Co.

LUBRICATORS
Cook's Sons, Adam.
Crane Co.
Griscom-Russell Co.
Lunkenheimer Co.
Powell Co., The William.
Sun Co.
Williams Valve Co., D. T.

LUMBER
Long-Bell Lumber Co.
Morse Dry Dock & Repair Co.

MACHINISTS
Thacher Propeller & Foundry Corp.

MACHINE GUARDS
Page Steel & Wire Co.

MACHINE TOOLS
Cleveland Pneumatic Tool Co.
Cleveland Punch & Shear Works Co.
Niles-Bement-Pond Co.
Pratt & Whitney Co.
Ryerson, Jos. T., & Son.

MACHINISTS' TOOLS
Williams & Co., J. H.

MANGANESE BRONZE CASTINGS
American Manganese Bronze Co.
Columbian Bronze Corp.
Cramp, Wm., & Sons, Ship & Engine Bldg. Co.
Griscom-Russell Co.
Hyde Windlass Co.
Lunkenheimer Co.
Powell Co., The William.

MAGNESIA GOODS AND MATERIALS
Magnesia Association of America.

MALLEABLE AND STEEL CASTINGS
Crane Co.
Malleable Iron Fittings Co.

MANDRELS
Pratt & Whitney Co.

MANHOLES
Rnerson, Jos. T., & Son.
Thacher Propeller & Foundry Corp.

MANILA AND SISAL ROPE
(See Rope.)

MANIFOLDS
Cleveland Pneumatic Tool Co.

MANUFACTURING PLANTS
(See Builders.)

MARINE BOILER HEADS
(See Boiler Heads.)

MARINE CABLEWAYS
Lidgerwood Mfg. Co.

MARINE COATINGS
(See Anti-Rust Coatings.)

MARINE DECKING
(See Decking.)

MARINE ELECTRICAL EQUIPMENT
(See Electrical Fittings and Supplies.)

MARINE ENGINES
(See Engines, Propelling.)

MARINE ENGINEERS
(See Engineers, Consulting.)

MARINE FORGINGS
(See Forgings.)

MARINE GLUE
Ferdinand & Co., L. W.
Williams, Wm. E.

MARINE HARDWARE
Bridgeport Brass Co.
Consolidated Shipbuilding Corp.
Ferdinand & Co., L. W.
Rostand Mfk. Co.
Sands & Son Co., A. B.
Thacher Propeller & Foundry Corp.
Tiebout, W. & J.
Waterbury Mfg. Co.
Wilcox, Crittenden & Co., Inc.
Williams, Wm. E.

MARINE HEATERS
(See Heaters.)

MARINE INTER-COMMUNICATION EQUIPMENT
Cory, Chas., & Son, Inc.
Western Electric Co.

MARINE LIGHTING SETS
(See Electric Plants.)
Williams, Wm. E.

MARINE PAINT
(Also see Paint.)
Briggs Bituminous Composition Co., Inc.
Dixon Crucible Co., Jos.
Federal Composition & Paint Co., Inc.
International Compositions Co.
Sherwin-Williams Co.
Wadsworth, Howland & Co.
Wailes Dove-Hermiston Corp.
Williams, Wm. E.

MARINE PLUMBING
Crane Co., The.
Mott Iron Works, J. L.
Sands & Son Co., A. B.

MARINE RAILWAY BUILDERS
Crandall Engineering Co.

MARINE RAILWAYS
(See Dry Docks.)

MARINE RANGES
(See Ranges.)

MARINE REFRIGERATION
(See Refrigerating Machinery.)

MARINE REPAIRS
(See Shipbuilders.)

MARINE SECURITIES
Marine Corporation.

MARINE SHAFTING
(See Shafting.)

MARINE SPECIALTIES
(See Steam Specialties.)

MARINE SUPERHEATERS
Babcock & Wilcox Co.
Badenhausen Co.
Heine Safety Boiler Co.
Locomotive Superheater Co.
Power Specialty Co.

MARINE SUPPLIES
Ferdinand & Co., L. W.
Tiebout, W. & J.
Williams, Wm. E.

MARINE WIRING DEVICES
Benjamin Electric Mfg. Co.
Conlan Electric Co.
Cory, Chas., & Son, Inc.
General Electric Co.
Seidler-Miner Co., Inc.
Western Electric Co.

MASTS, TUBULAR STEEL
National Tube Co.

MATTRESSES
Bernstein Mfg. Co.
Foster Bros. Mfg. Co.
Southern-Rome Co.

MECHANICAL TELEGRAPHS
Chadburn (Ship) Telegraph Co.
Cory, Chas., & Son, Inc.
Radio Corporation of America.
Williams, Wm. E.

METALLIC PACKING
(Also see Packing.)
France Packing Co.
Goetze Gasket & Packing Co.
Martell Packings Co.
U. S. Metallic Packing Co.

METERS, ELECTRIC
General Electric Co.
Western Electric Co.
Weston Elec. Instrument Co.

MILLING MACHINES
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.
Standard Tool Co.

MINERAL WOOL
(See Non-Conducting Covering.)

MONEL METAL
International Nickel Co.

MOORING ENGINES
American Engineering Co.
Dake Engine Co.
Flory Mfg. Co., S.
Hyde Windlass Co.
Lidgerwood Mfg. Co.
Maine Elertric Co.
Mundy, J. S., Hoisting Eng. Co.
National Hoisting Engine Co.

MOORING FIXTURES
Penn Seaboard Steel Corp.
Stevens-Aylsworth Co., Inc.
Thacher Propeller & Foundry Corp.

MOORING PORTS AND RINGS
Stevens-Aylsworth Co., Inc.

MOTOR BOATS
(See Launches and Yachts.)

MOTOR BOAT SUPPLIES
Ferdinand & Co., L. W.
Tiebout, W. & J.
Williams, Wm. E.

MOTORS, ELECTRIC
Fairbanks, Morse & Co.
General Electric Co.
Western Electric Co.

MOTORS, GASOLINE
(See Gasoline Engines.)

MOTORS, STEAM
Steam Motors Co.

MOTOR TRUCKS
Packard Motor Truck Co.

MULTIPLE DRILLS
Niles-Bement-Pond Co.

MULTIPLE PUNCHES
Cleveland Punch & Shear Works.
Niles-Bement-Pond Co.
Thomas Spacing Machine Co.

MULTIWHIRL OIL COOLERS
Griscom-Russell Co.

NAILS
Malleable Iron Fittings Co.
Ryerson, Jos. T., & Son.

NAUTICAL INSTRUMENTS
Hand, John E., & Sons Co.
McNab Co., The.
Sperry Gyroscope Co.
Williams, Wm. E.

NAVAL ARCHITECTS
Bogert, John L.
Chapman & Fisher.
Cox & Stevens.
Donnelly, William T.
Ferris, Theodore.
Haight, Robert S.
Hansen, Max.
Harris, Leonard B.
Hough, Edward S.
Lysholm, Henry, Inc.
McClelland, N. E., & Co., Ltd.
McKinlay, James.
Matthews, John B.
Nilson, Leonard J.
Watts, J. Murray.

NEEDLE VALVES
(See Valves.)

NIPPLES
Crane Co., The.
Lunkenheimer Co., The.

NON-CONDUCTING COVERINGS
Magnesia Association of America.
Morse Dry Dock & Repair Co.
Thorsen, P. S., & Co., Inc.

NON TOPPLING BLOCKS
American Balsa Co.

NOZZLES
(See Hose Nozzles.)

NUTS
(See Bolts and Nuts.)
Russell, Buprdsall & Ward Bolt & Nut Co.
Ryerson, Jos. T., & Son.
Waterbury Mfg. Co.
Williams, Wm. E.

OAK FLOORING
Long-Bell Lumber Co.

OAKUM
America Balsa Co.
American Mfg. Co.
Standard Oakum Co., George.
Wall Rope Works, Inc.

OIL
(See Lubricants.)

OIL BURNERS, FUEL
(See Fuel Oil Burners.)

OIL BURNING EQUIPMENT
Kinney Mfg. Co.
Pommer, Walter C
Schutte & Koerting Co.
Wayne Oil Tank & Pump Co.
White Fuel Oil Engineer'g Corp.
Williams, Wm. E.

OIL CANS
National Marine Lamp Co.

OIL COOLERS
Griscom-Russell Co.
Ross Heater & Mfg. Co.
Schutte & Koerting Co.

OIL CUPS
Cook's Sons, Adam.
Crane Co.
Griscom-Russell Co.
Lunkenheimer Co.
Powell Co., The William.
Sun Co.
Waterbury Mfg. Co.
Williams Valve Co., D. T.
Williams, Wm. E.

OIL ENGINES
(See Engines, Oil.)

OIL FUEL
Sun Co.
Texas Co., The.

OIL FUEL APPARATUS
(See Oil-Burning Equipment.)

OIL FURNACES
Baird Pneumatic Tool Co.
Baush Machine Teol Co.
Wayne Oil Tank & Pump Co.

OIL GAUGES
Crane Co.
Lunkenheimer Co.
Powell Co., The William.
Union Water Meter Co.
Williams Valve Co., D. T.
Williams, Wm. E.

OIL HEATERS AND COOLERS
Griscom-Russell Co.
Ross Heater & Mfg. Co.
Row & Davis, Engineers, Inc.
Schutte & Koerting Co.

OIL AND PAINT STORAGE SYSTEM
Wayne Oil Tank & Pump Co.

OIL PUMPS
Cameron Steam Pump Wks, A. S.
Davidson, M. T., Co.
Dean Bros. Steam Pump Works.
Kinney Mfg. Co.
Lunkenheimer Co.
Powell Co., The William.
National Transit Pump & Machine Co.
Ross Heater & Mfg. Co.
Steam Motors Co.
Sands, A. B., & Son Co.
Terry Steam Turbine Co.
Williams Valve Co., D. T.
Worthington Pump & Mach. Corp.

OIL PURIFIERS
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Griscom-Russell Co.
Schutte & Koerting Co.

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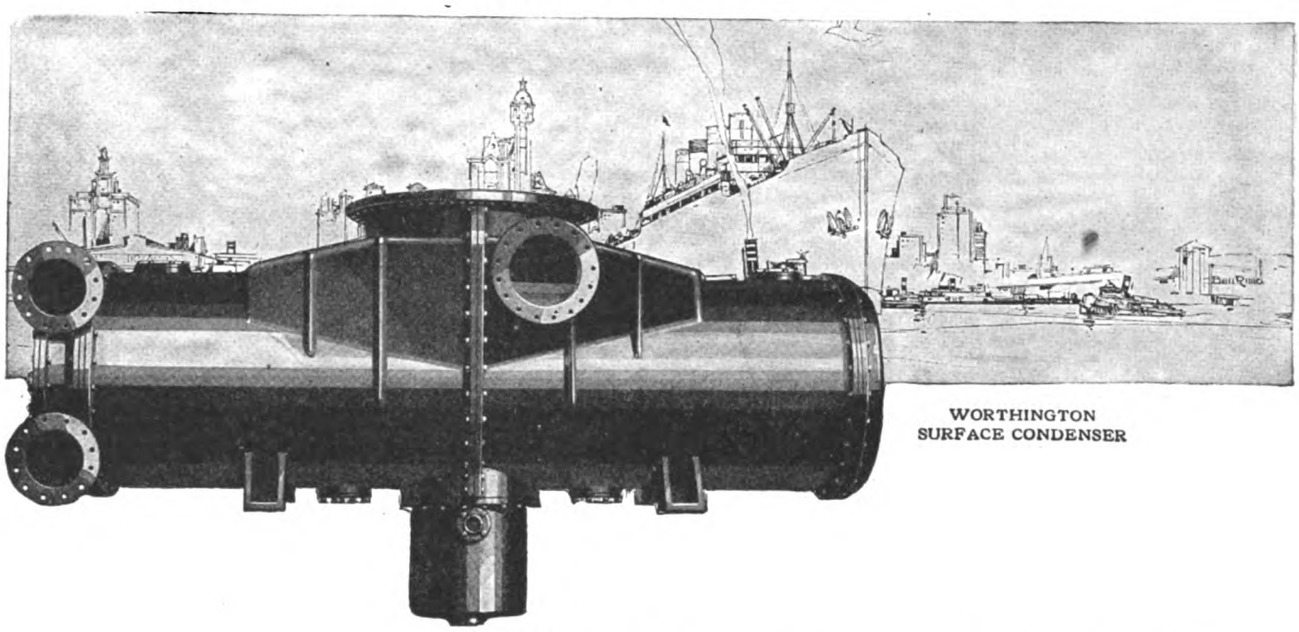

WORTHINGTON
SURFACE CONDENSER

Worthington on Land or Sea the world's standard

WITH 2000 miles of deep water between you and the nearest shipyard, it's good to know that your condensing machinery is Worthington built.

For you know that Worthington marine pumps are standard in the U.S. Navy and Merchant Marine and you know, too, that those standards are not easily satisfied. So it is logical that Worthington Marine Condenser shall also be up to the standard of the other world-famous Worthington apparatus.

There is no type or capacity condensing machinery that Worthington does not build; and whether for shipyard or for land service, there is Worthington condensing machinery to meet and satisfy any service requirement.

On the seven seas and in both hemispheres, Worthington by name or trademark is known and accepted as world's standard for pumps and pumping machinery—the reward for 80 years of faithful, worthy service.

Other Worthington Products

Steam and Power Pumps, Air Compressors, Marine Condensers, Centrifugal Pumps. A complete line of Motorship Auxiliary Equipment.

To further enlarge their service, Worthington have acquired the good-will and mechanical equipment of the Platt Iron Works, Dayton, Ohio, for manufacturing Oil Mill Machinery, Hydraulic Turbines, Feedwater Heaters and High Pressure Air Compressors.

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***Executive Offices:* 115 Broadway, New York City**
Branch Offices in 24 Large Cities

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PUMPS—COMPRESSORS—CONDENSERS—OIL & GAS ENGINES—METERS—MINING—ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Deane Works, *Holyoke, Mass.*
Blake & Knowles Works *East Cambridge, Mass.*
Worthington Works *Harrison, N. J.*
Laidlaw Works, *Cincinnati, Ohio.*
Hazleton Works, *Hazleton, Pa.*
Gas Engine Works, *Cudahy, Wis.*
Power & Mining Works *Cudahy, Wis.*
Snow-Holly Works *Buffalo, N. Y.*
Epping-Carpenter, *Pittsburgh, Pa.*

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OIL TANKS
Stevens-Aylsworth Co., Inc.

OIL TANKERS
(See Tank Ships.)

OILING SYSTEMS
(Also see Lubricants.)
Cook's Sons, Adam.
Lunkenheimer Co.
Powell Co., The William.

ORE-HANDLING MACHINERY
(See Coal-Handling Machinery.)

OXY-ACETYLENE WELDING AND CUTTING
Morse Dry Dock & Repair Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.
Vulcan Iron Works, Inc.

OXYGEN
International Oxygen Co.
Linde Air Products Co.
Oxweld Acetylene Co.
Prest-O-Lite Co.

OXYGEN GENERATORS
International Oxygen Co.

PACKING
(Also see Metallic Packing and Ammonia Packing.)
Dew Valve Co.
France Packing Co.
Goetze Gasket & Packing Co.
Johns-Pratt Co.
Martell Packings Co.
New York Belting & Packing Co.
United States Metallic Packing Co.
Williams, Wm. E.

PACKING, ASBESTOS
Crane Co.
Morse Dry Dock & Repair Co.
New York Belting & Packing Co.
Williams, Wm. E.

PACKINGS, LEATHER
Watson-Stillman Co.

PAINT
Dixon Crucible Co.
Federal Composition & Paint Co.
International Compositions Co.
Marine Decking & Supply Co.
Sherwin-Williams Co.
Texas Co., The.
Wadsworth, Howland & Co.
Wailes Dove-Hermiston Corp.
Williams, Wm. E.

PAINT SPRAYING EQUIPMENT
(See Pneumatic Paint Spraying Equipment.)

PANEL BOARDS
(Marine.)
Benjamin Electric Mfg. Co.
Cory, Chas., & Son, Inc.
Crouse-Hinds Co.

PANELLING
(Marine Fireproof.)
Marine Decking & Supply Co.

PARTITIONS
(Marine Fireproof.)
Marine Decking & Supply Co.

PATCH BOLTS
Penn Seaboard Steel Corp.

PATTERNS
Thacher Propeller & Foundry Corp.

PENCILS
(See Drawing Pencils.)

PHOSPHER BRONZE CASTINGS
American Manganese Bronze Co.
Columbian Bronze Corp.
Griscom-Russell Co.
Hyde Windlass Co.
Lunkenheimer Co.

PILE DRIVERS
Flory, S., Mfg. Co.
Lidgerwood Mfg. Co.
McMyler-Interstate Co.
Mundy Hoisting Eng. Co., J. S.

PIPE
American Spiral Pipe Works.
National Tube Co.
Reading Iron Co.
Watson-Stillman Co.
Williams, Wm. E.

PIPE BENDING MACHINES
American Pipe Bending Machine Co.
Baird Pneumatic Tool Co.
Buffalo Forge Co.
Ryerson, Jos. T., & Son.
Watson-Stillman Co.

PIPE COVERING
(See Non-Conducting Covering.)

PIPE CUTTING AND THREADING MACHINE
Niles-Bement-Pond Co.
Williams, Wm. E.

PIPE EXPANDING AND FLANGING MACHINES
Watson-Stillman Co.

PIPE FLANGES
(See Flanges.)

PIPE JOINTS
Dew Valve Co.

PIPE UNIONS
Crane Co.
Dart Mfg. Co.
Lunkenheimer Co., The.
Powell Co., The William.
Williams Valve Co., D. T.
Williams, Wm. E.

PIPE WELDING
Metal & Thermit Corp.

PIPE WRENCHES
Williams & Co., J. H.
Williams, Wm. E.

PISTON RINGS
(See Packings.)

PISTON RODS
Heppenstall Forge & Knife Co.
Pollak Steel Co.

PLANERS
(Metal Working.)
Cleveland Pneumatic Tool Co.
Lynd-Farquhar Co.
Niles-Bement-Pond Co.
Ryerson, Jos. T., & Son.

PLANIMETERS
American Steam Gauge & Valve Mfg. Co.
Williams, Wm. E.

PLATE-BENDING ROLLS
(See Rolls, Bending & Straightening.)

PLATE AND ANGLE HEATING FURNACES
Baush Machine Tool Co.

PLATE CASTORS
(See Castors.)

PLATE PUNCH TABLES
Thomas Spacing Machine Co.

PLATE SHEARS
The Quickwork Co.

PLATES
(See Steel Plates and Shapes.)

PLUGS AND RECEPTACLES—WATERTIGHT
Benjamin Electric Mfg. Co.
Cory, Chas., & Son, Inc.
Western Electric Co.
Williams, Wm. E.

PLUMBAGO
(Also see Graphite.)
Dixon, Jos., Crucible Co.
Williams, Wm. E.

PLUMBERS' TOOLS
Williams & Co., J. H.
Williams, Wm. E.

PLUMBING
(See Marine Plumbing.)

PLUNGER PUMPS FOR OIL-BURNING EQUIPMENT
Kinney Mfg. Co.

PNEUMATIC DRILLS
(See Pneumatic Tools.)

PNEUMATIC HAMMERS
(See Pneumatic Tools.)
Nazel Engineering & Mach. Co.

PNEUMATIC HOSE
(See Air Hose.)
Goodrich Rubber Co., B. F.
New York Belting & Packing Co.
Sands, A. B., & Son Co.

PNEUMATIC PAINT SPRAYING EQUIPMENT
Spray Engineering Co.

PNEUMATIC RIVETERS
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Ingersoll-Rand Co.
Keller Pneumatic Tool Co.
Oldham, George & Son Co.
Ryerson, Jos. T., & Son.
Watson-Stillman Co.

PNEUMATIC SEPARATORS
Griscom-Russell Co.

PNEUMATIC TOOLS
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Cleveland Pneumatic Tool Co.
Chicago Pneumatic Tool Co.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Keller Pneumatic Tool Co.
Nazel Engineering & Mach. Co.
Oldham, George, & Son Co.

POP SAFETY VALVES
American Steam Gauge & Valve Mfg. Co.
Ashton Valve Co.
Crane Co.
Dew Valve Co.
Lunkenheimer Co.
Powell Co., The William.
Williams, Wm. E.

POPPET VALVES
(See Valves.)

PORTABLE DRILLS
Baird Pneumatic Tool Co.
General Electric Co.
Lynd-Farquhar Co.

PORTABLE ELEVATORS
(For Handling Bulk Materials.)

PORTABLE PUNCHES AND RIVETERS
Baird Pneumatic Tool Co.

PORT LIGHTS
(See Air Ports.)

POWER HAMMERS
Chambersburg Engineering Co.
The Quickwork Co.

POWER PUNCHES
Watson-Stillman Co.

POWER PUNCHES AND SHEARS
Buffalo Forge Co.
Cleveland Punch & Shear Works Co.
Niles-Bement-Pond Co.
Norbom Engineering Co.
Ryerson, Jos. T., & Son.
Southwark Fdry & Machine Co.

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Cleveland Punch & Shear Works Co.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Niles-Bement-Pond Co.
Oldham, George, & Son Co.
Ryerson, Jos. T., & Son.
Watson-Stillman Co.

POWER SHEARS
Buffalo Forge Co.
Cleveland Punch & Shear Works Co.
Niles-Bement-Pond Co.
Quickwork Co.
Ryerson, Jos. T., & Son.

PRESSES
(See Hydraulic Presses.)

PRESSURE REGULATORS
Ashton Valve Co.
Crane Co.
Lunkenheimer Co.
Mason Regulator Co.
Powell Co., The William.
Schutte & Koerting Co.

PROFESSIONAL CARDS
Ansell & Bailey.
Bogert, John L.
Bonner, William T.
Chapman & Fisher.
Churchill & MacLeod.
Ferris, Theodore.
Haight, Robert S.
Hough, Edward S.
Lysholm, Henry, Inc.
Matthews, John B.
McClelland, N. E., & Co., Ltd.
Nilson, Leonard J.
Pommer, Walter E.
Watts, J. Murray.

PROJECTORS
(See Searchlights.)

PROPELLER SHAFTS
(See Shafting.)

PROPELLER WHEEL DESIGNS
Thacher Propeller & Foundry Corp.

PROPELLER WHEELS
American Manganese Bronze Co.
Columbian Bronze Corp.
Consolidated Shipbuilding Corp.
Cramp, Wm., & Sons Ship & Engine Bldg. Co.
Donnelly, Wm. T.
Hardie-Tynes Mfg. Co.
Hyde Windlass Co.
Kearfott Engineering Co.
Penn Seaboard Steel Corp.
Thacher Propeller & Foundry Corporation.
Trout Co., H. G.

PUMP GOVERNORS
Mason Regulator Co.
Schutte & Koerting Co.
Williams, Wm. E.

PUMPING MACHINERY
(See Engines, Pumping.)

PUMPS
Alberger Pump & Condenser Co.
Cameron Steam Pump Wks, A. S.
Chambersburg Engineering Co.
Davidson Co., M. T.
Dean Bros. Steam Pump Works.
De Laval Steam Turbine Co.
Fairbanks, Morse & Co.
Griscom-Russell Co.
Howden, James, & Co.
Hush, H. J.
Hyde Windlass Co.
Kinney Mfg. Co.
Morris Machine Works.
National Transit Pump & Machine Co.
Row & Davis, Engineers, Inc.
Sands & Son Co., A. B.
Terry Steam Turbine Co.
Watson-Stillman Co.
Wheeler Condenser & Eng. Co.
Wheeler Mfg. Co., C. H.
Westinghouse Electric & Mfg. Co.
Williams, Wm. E.
Worthington Pump & Mach. Corp.

PUMP VALVES—METALLIC
Dew Valve Co.

PUMP VALVES, RUBBER
New York Belting & Packing Co.

PUNCHING MACHINES
(See Power Punches.)

PUNCHES AND DIES
Cleveland Punch & Shear Works Co.
Pratt & Whitney Co.

PUNCHES, SHEARS AND BAR CUTTERS COMBINED
Buffalo Forge Co.
Ryerson, Jos. T., & Son.

PUNCHING AND SHEARING MACHINES
(See Power Punches and Shears.)

PUNCH TABLES
(See Spacing Tables.)

PUSH BUTTONS
Cory, Chas., & Son, Inc.

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Locomotive Superheater Co.
Taylor Instrument Companies.
Williams, Wm. E.

QUADRANT DAVITS
(See Davits.)

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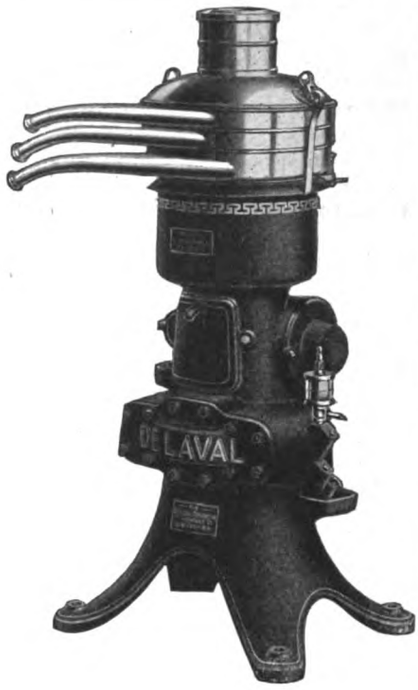

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Nicholson File Co.

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Taylor Instrument Companies.

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Lunkenheimer Co.
Mason Regulator Co.
Schutte & Koerting Co.
Williams, Wm. E.

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Jerguson Gage & Valve Co.

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Clothel Refrigerating Co.
Frick Co.
Griscom-Russell Co.
Kroeschell Bros. Ice Machine Co.
Norwalk Iron Works.
Remington Machine Co.
Roelker, H. B.
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Lunkenheimer Co.
Mason Regulator Co.
Powell Co., The William.
Sands, A. B., & Son Co.
Schutte & Koerting Co.
Union Water Meter Co.
Williams, Wm. E.

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Steward Davit & Equip. Corp.

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Ashton Valve Co.
Crane Co.
Dew Valve Co.
Lunkenheimer Co.
Lunkenheimer Co.
Powell Co., The William.
Schutte & Koerting Co.
Watson-Stillman Co.
Williams, Wm. E.

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Williams, Wm. E.

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Western Electric Co.

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(See Rope; also Wire Rope.)

RIVER BOATS
(See Shipbuilders.)

RIVETS
Carlin, Anthony.
Champion Rivet Co.
Harvey, Arthur C., Co.
Ryerson, Jos. T., & Son.
Severance Mfg. Co., S.

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International Reclaiming Co.

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Ingersoll-Rand Co.
Keller Pneumatic Tool Co.

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American Car & Foundry Co.
Baush Machine Tool Co.

RIVET SETS
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(See Pneumatic Riveters and Power Riveters.)

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Chicago Pneumatic Tool Co.
Independent Pneumatic Tool Co.
Niles-Bement-Pond Co.

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Chase Rolling Mill Co.
Williams, Wm. E.

RODS (STEEL)
Harvey, Arthur C., Co.
Pollak Steel Co.

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(See Welding Rods,)

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Sperry Gyroscope Co.

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New Jersey Zinc Co.
Williams, Wm. E.

ROLLER BEARINGS
Bantam Ball Bearing Co.

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Heppenstall Forge & Knife Co.
Niles-Bement-Pond Co.
Pollak Steel Co.
Ryerson, Jos. T., & Son.

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The Quickwork Co.

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Texas Co., The.

ROOFING PAINTS
Dixon, Joseph, Crucible Co.
Ferdinand, L. W., & Co.
International Compositions Co.

ROPE
(Also see Wire Rope.)
Ajax Rope Co.
American Mfg. Co.
Broderick & Bascom Rope Co.
Columbian Rope Co.
Durable Wire Rope Co.
Granger, George B., & Co.
McNab Co., The.
Plymouth Cordage Co.
Samson Cordage Works.
Wall Rope Works, Inc.
Waterbury Co.
Whitlock Cordage Co.
Wickwire Spencer Steel Corp.

ROPE TRANSMISSION
Ajax Rope Co.
American Mfg. Co.
Broderick & Bascom Rope Co.
Columbian Rope Co.
Wall Rope Works, Inc.
Whitlock Cordage Co.

ROTARY BLOWERS
(See Blowers.)

ROTATING PLUNGER PUMPS
Kinney Mfg. Co.

ROTARY PUMPS
Kinney Mfg. Co.
Sands, A. B., & Son Co.

ROTARY SHEARS
Quickwork Co., The.

ROWBOATS
(See Launches and Yachts.)

ROWLOCKS
Malleable Irin Fittings Co.

RUBBER GOODS
(Also see Packing; also see Interlocking Rubber Tiling.)
Goodrich Rubber Co., B. F.
New York Belting & Packing Co.
United States Rubber Co.
Williams, Wm. E.

RUBBER MATS
New York Belting & Packing Co.

RUBBER TILING
(See Interlocking Rubber Tiling.)

RUDDERS
Penn Seaboard Steel Corp.

RUDDER PINTLE BORING MACHINE
Pedrick Tool & Machine Co.

RUDDER POSTS
Hardie-Tynes Mfg. Co.
Penn Seaboard Steel Corp.
Williams, Wm. E.

SAFETY DEVICES
(See Life Saving Devices.)

SAFETY VALVES
(See Valves.)

SANITARY FITTINGS
(See Plumbing.)

SANITARY PUMPS
Davidson Co., M. T.
Dean Bros. Steam Pump Works.
Morris Machine Works.
Sands, A. B., & Son Co.
Worthington Pump & Mach. Corp.

SCALES—ALL KINDS
Fairbanks, Morse & Co.

SCREW CUTTING TOOLS AND GAUGES
Pratt & Whitney Co.

SCREW PLATES
Williams, Wm. E.

SCREW PUNCHES
Cleveland Punch & Shear Works Co.

SCUTTLES
Steward Davit & Equip. Corp.

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National Tube Co.
Ryerson, Jos. T., & Son.

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Carlisle & Finch Co.
Crouse-Hinds Co.
General Electric Co.
Sperry Gyroscope Co.
Western Electric Co.

SENTINEL VALVES
(See Valves.)

SHACKLES
Admiral Anchor Co.
Baldt Anchor Co.

SHAFT STEEL
(See Steel Shafting.)

SHAFTING
(Seamless Steel.)
Hardie-Tynes Mfg. Co.
Heppenstall Forge & Knife Co.
Kearfott Engineering Co.
Morse Dry Dock & Repair Co.
National Tube Co.
Pollak Steel Co.
Ryerson, Jos. T., & Son.
Williams, Wm. E.

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(Hollow Seamless Steel.)
Mesta Machine Co.

SHAFTING—BRONZE
American Manganese Bronze Co.
Chase Metal Works.
Chase Rolling Mill Co.

SHAFTS—PROPELLER
Pollak Steel Co.

SHAPES
(Rolled Steel.)
Pollak Steel Co.

SHEARING MACHINES
(See Power Shears.)
The Quickwork Co.

SHEET METAL
Morse Dry Dock & Repair Co.

SHEET METAL WORKING MACHINES
The Quickwork Co.

SHEET METAL SHEARS
The Quickwork Co.

SHEET RUBBER TILING
United States Rubber Co.

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American Balsa Co.
American Ship Building Co.
Baltimore Dry Docks & Shipbuilding Co.
Bath Iron Works.
Bethlehem Shipbuilding Corp.
Charleston Dry Dock & Machine Co.
Consolidated Shipbuilding Corp.
Cramp, Wm., & Son, Ship & Engine Bldg. Co.
Davis & Son, M. M., Inc.
Defoe Shipbuilding Co.
Fletcher, W. & A.
Fuller Co., Geo. A.
Howard Shipyards & Dock Co.
Johnson Iron Works, Ltd.
McDougall-Duluth Co.
Merchant Shipbuilding Corp.
Morse Dry Dock & Repair Co.
Newburgh Shipyards, Inc.
Newport News Shipbuilding & Dry Dock Co.
New London Ship & Engine Co.
Standard Motor Construction Co.
Staten Island Shipbuilding Co.
Todd Shipyards Corp.
Union Dry Dock & Repair Co.,
Vulcan Iron Works, Inc.
Ward, Chas., Engineering Works.

SHIPBUILDING CRANES
(See Cranes.)

SHIP BROKERS
Bogert, John L.
Brenzinger, A. H.
Cox & Stevens.
Ferris, Theodore.
Haight, Robert S.
Hough, Edward S.
Maritime Engineering & Sales Corp.
McClelland, N. E., & Co., Inc.
Pommer, Walter E.
Watts, J. Murray.

SHIP CHANDLERS
Williams, Wm. E.

SHIP CLOCKS
(See Clocks.)

SHIP COMPOSITIONS
International Composition Co.
Wailes Dove-Hermiston Corp.

SHIP COWLS
(See Cowls.)

SHIP FITTINGS, SUPPLIES AND EQUIPMENT
Ferdinand, L. W., & Co.
Griscom-Russell Co.
Williams, Wm. E.

SHIP GLUE
(See Marine Glue.)

SHIP GRATINGS
Irving Iron Works Co.

SHIP HAMMERS—ELECTRIC
Western Electric Co.

SHIP LOCKS AND LATCHES
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Williams, Wm. E.

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(See Steel Plates; also Zinc Ship and Boiler Plates.)
New Jersey Zinc Co.

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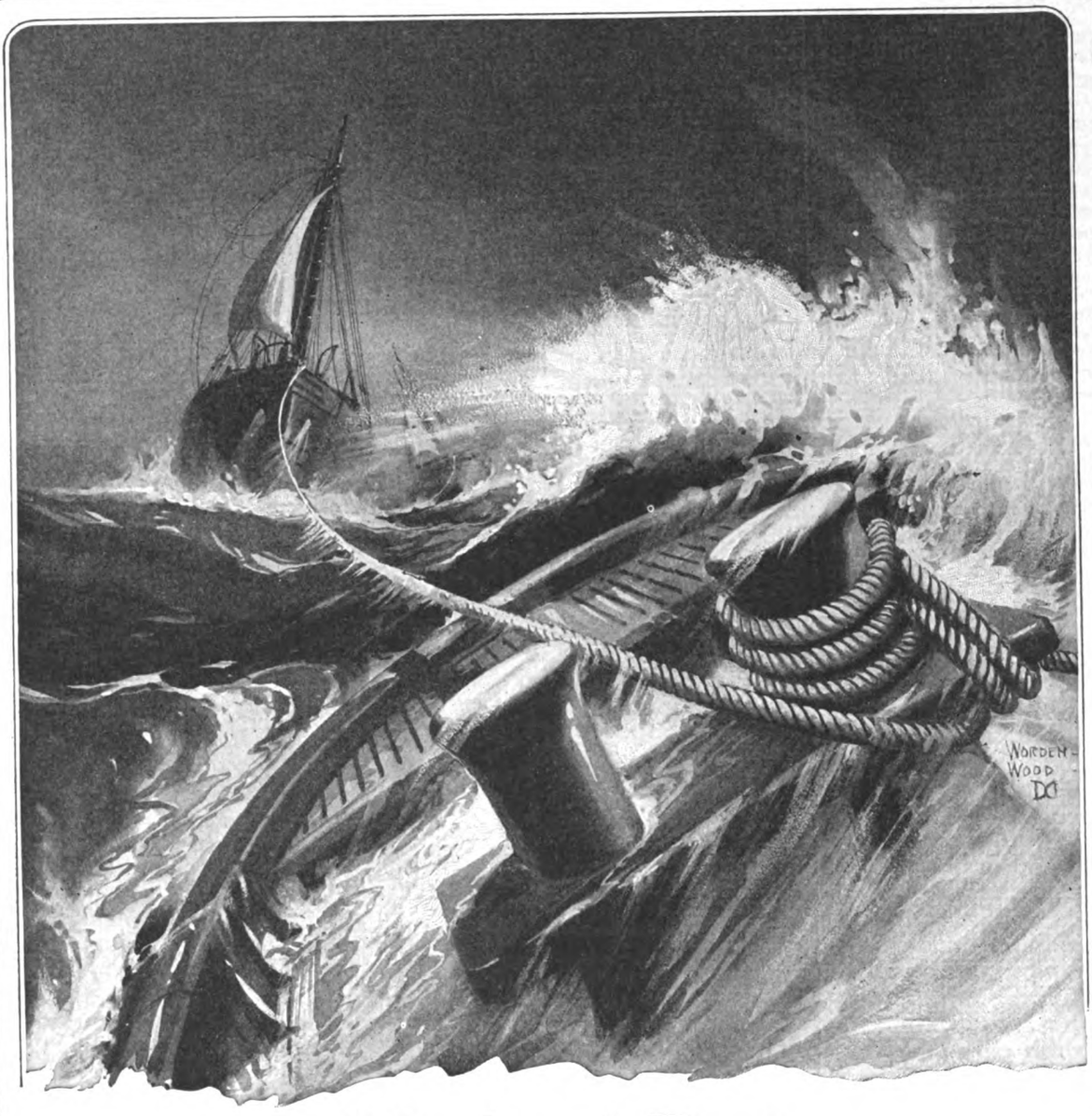

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(See Rivets.)

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(See Chandlery Stores.)

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Cory, Chas., & Son, Inc.

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Western Electric Co.

SHIP TIMBERS
(See Lumber.)

SHIP UPHOLSTERY
Duratex Co.

SHIPYARDS
(See Shipbuilders.)

SHIPYARD CRANES
(See Cranes.)

SHIPYARDS WHIRLERS
(See Cranes.)
O'Rourke Crane & Eng. Co.

SHOP CRANES
(See Cranes.)

SIGNALLING APPARATUS
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Cory, Chas., & Son, Inc.

SKYLIGHT LIFTING GEAR
Tiebout, W. & J.

SLEEVES
(See Sockets and Sleeves.)

SLITTING MACHINES
The Quickwork Co.

SLOTTING MACHINES
Niles-Bement-Pond Co.

SMALL TOOLS
(See Bench Tools.)

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Smooth-On Mfg. Co.

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Texas Co., The.
Williams, Wm. E.

SOCKETS AND SLEEVES
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Pratt & Whitney Co.
Williams & Co., J. H.

SOUNDING MACHINES
Hand, John E., & Son Co.
Williams, Wm. E.

SOUTHERN PINE
(See Lumber.)

SPACING TABLES WITH MULTIPLE PUNCHES
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Williams, Wm. E.

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The Quickwork Co.

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Williams, Wm. E.

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(See Adjustable Sprocket Rims.)

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STANDARDIZED WOODWORK
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Baird Pneumatic Tool Co.

STAYBOLT IRON
Harvey, Arthur C., Co.

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(See Taps & Dies.)

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(See Engines.)

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American Steam Gauge & Valve Mfg. Co.
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Crane Co., The.
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Powell Co., The William.
Taylor Instrument Companies.
Williams Valve Co., D. T.
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STEAM HAMMERS
Chambersburg Engineering Co.
Niles-Bement-Pond Co.

STEAM HOISTS
(See Hoisting Engines.)

STEAM HOSE
Ingersoll-Rand Co.
New York Belting & Packing Co.

STEAM PIPE COVERINGS
(See Non-Conducting Coverings.)

STEAM PUMPS
(See Pumps.)

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Griscom-Russell Co.
Schutte & Koerting Co.
Tracy Engineering Co.
Williams Valve Co., D. T.

STEAM SPECIALTIES
(See Pumps, Valves, Gauges, Lubricators, etc.)

STEAM SUPERHEATERS
(See Marine Superheaters.)

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Griscom-Russell Co.
Mason Regulator Co.
Pratt & Cady Co., Inc.
Sands, A. B., & Son Co.
Union Water Meter Co.
Williams Valve Co., D. T.
Williams, Wm. E.

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Bath Iron Works.
Bethlehem Shipbuilding Corp.
Cramp, Wm., & Sons Ship & Engine Bldg. Co.
De Laval Steam Turbine Co.
Fletcher, W. & A., Co.
General Electric Co.
Hallidie Co.
Howden, James, & Co.
Kearfott Engineering Co.
Parsons Marine Steam Turbine Co.
Terry Steam Turbine Co.
Vulcan Iron Works, Inc.
Western Eelectric Co.
Westinghouse Electric & Mfg. Co.

STEAM TURBINE DYNAMOS
De Laval Steam Turbine Co.
General Electric Co.
Vulcan Iron Works, Inc.
Western Electric Co.
Westinghouse Electric & Mfg. Co.

STEEL (FOR SHIPBUILDING PURPOSES)
Harvey Co., Arthur C.

STEEL BALLS
Bantam Ball Bearing Co.
Gwilliam Co., The.

STEEL CASTINGS
See Castings, Steel.)

STEEL MASTS
Great Lakes Engineering Works.

STEEL PIPE
Crane Co.
National Tube Co.

STEEL PLATES
(See Steel Plates and Shapes.)

STEEL PLATE CONSTRUCTION
Heine Safety Boiler Co.

STEEL PLATES AND SHAPES
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Lukens Steel Co.
Penn Seaboard Steel Corp.
Ryerson, Jos. T., & Son.

STEEL SHAFTING
(See Shafting.)

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Heine Safety Boiler Co.
Stevens-Aylsworth Co., Inc.
Wayne Oil Tank & Pump Co.

STEERING ENGINES
Allan-Cunningham Co.
American Engineering Co.
Dake Engine Co.
Hadfield-Penfield Steel Co.
Hyde Windlass Co.
Kearfott Engineering Co.
Lidgerwood Mfg. Co.
Maine Electric Co.
Maritime Engineering & Sales Corp.
Mundy Hoisting Engine Co., J. S.
National Hoisting Engine Co.

STEERING GEARS
Allan-Cunningham Co.
American Engineering Co.
Dake Engine Co.
Howden, James, & Co.
Hadfield-Penfield Steel Co.
Hyde Windlass Co.
Lidgerwood Mfg. Co.
Maine Electric Co.
Maritime Engineering & Sales Corp.
Mundy Hoisting Engine Co., J. S.
National Hoisting Engine Co.
National Marine Engine Works.

STEERING WHEELS
American Engineering Co.
Dake Engine Co.
Hadfield-Penfield Steel Co.
Hand, John E., & Sons Co.
Hyde Windlass Co.
McNab Co., The.

STEMS
Penn Seaboard Steel Corp.

STEPS—SAFETY GRATING
Irving Iron Works Co.
Universal Safety Tread Co.

STERN FRAMES AND TUBES
Hardie-Tynes Mfg. Co.
Penn Seaboard Steel Corp.

STOP COCKS
(See Valves.)

STOVES
(See Ranges.)

STRAIGHTENING ROLLS
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SUPERHEATERS
(See Marine Superheaters.)

SUPERHEATER TUBES
National Tube Company.

SULPHURIC ACID
New Jersey Zinc Co.

SURFACE CONDENSERS
Davidson Co., M. T.
Ross Heater & Mfg. Co.
Wheeler Mg. Co., C. H.
Williams, Wm. E.

SURVEYING INSTRUMENTS
Hand, John E., & Sons Co.
New York Blue Print Paper Co.

SWIVELS
Williams & Co., J. H.

SWITCHES AND SWITCHBOARDS
(See Electrical Appliances.)

TACHOMETERS
(See Electric Tachometers.)

TACKLE BLOCKS
Williams, Wm. E.

TAIL SHAFTS
(See Shafting.)

TANKS
(Copper, Galvanized Iron.)
Bath Iron Works.
Fairbanks, Morse & Co.
Griscom-Russell Co.
Sands, A. B., & Sons Co.
Stevens-Aylsworth Co., Inc.

TANKS FOR OIL, GASOLINE, KEROSENE, ETC.
Pneumercator Co.

TANK GAUGES
Wayne Oil Tank & Pump Co.

TANK SHIPS
Baltimore Dry Docks & Shipbuilding Co.
Bath Iron Works.
Merchant Shipbuilding Corp.
Newport News Shipbuilding & Drydock Co.

TANK PUMPS
Davidson Co., M. T.

TANKS, SEAMLESS STEEL
Continental Iron Works, The.
National Tube Co.

TANKS, WELDED STEEL
Continental Iron Works, The.
Stevens-Aylsworth Co., Inc.

TAPERED LINERS
Irving Iron Works Co.

TAPS AND DIES
Brubaker, W. L., & Bros.
Pratt & Whitney Co.
Standard Tool Co.
Williams, Wm. E.

TARRED HEMP ROPE
Ajax Rope Co.
American Mfg. Co.
Wall Rope Works.
Whitlock Cordage Co.
Williams, Wm. E.

TEES—ROLLED STEEL
Harvey, Arthur C., Co.
Pollak Steel Co.
Ryerson, Jos. T., & Son.

TELEGRAPH APPARATUS AND TELEGRAPHS — MECHANICAL
(See Mechanical Telegraphs.)

TELEGRAPH FITTINGS, CHAIN AND WIRE
Cory, Chas., & Son, Inc.

TELEGRAPH FITTINGS AND VOICE TUBES AND FITTINGS
Cory, Chas., & Son, Inc.
Tiebout, W. & J.

TELEMOTORS—ELECTRIC AND HYDRAULIC
Allan-Cunningham Co.
American Engineering Co.
Hyde Windlass Co.
Maritime Engineering & Sales Corp.

TELEPHONES AND TELEPHONE APPARATUS
(Also see Ship Telephones.)
Cory, Chas., & Son, Inc.
Radio Corp. of America.
Western Electric Co.

THERMIT WELDING
Metal & Thermit Corp.
Powell Co., The William.
Schutte & Koerting Co.

THERMOMETERS
Hand, John E., & Sons Co.
Schaeffer & Budenberg Mfg. Co.
Taylor Instrument Companies.
Williams, Wm. E.

THRUST BEARINGS
(See Ball Bearings and Roller Bearings.)

TILING
(See Interlocking Rubber Tiling.)

TOOL STEEL
Harvey, Arthur C., Co.
Ryerson, Jos. T., & Son.

TOOLS, MACHINE
(See Machine Tools.)

TOOL HOLDERS
Williams & Co., J. H.

TORSION METERS
McNab Co., The.

TOWER CRANES
Maine Electric Co.
Mead-Morrison Mfg. Co.

TOWING HOOKS AND COCKS
American Engineering Co.

TOWING LINES
(See Rope and Wire Rope.)

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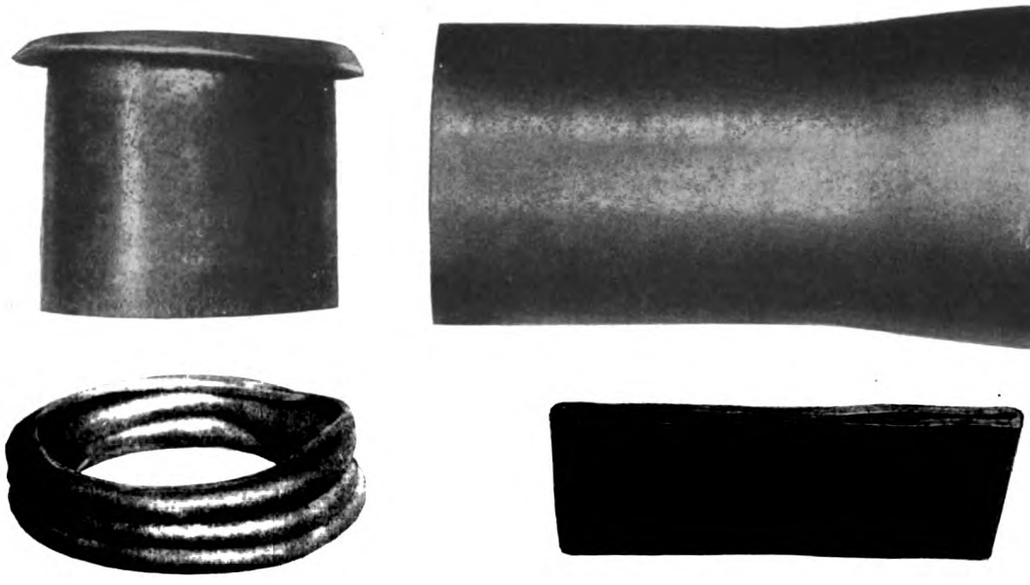
The Recognized Standard of

SEAMLESS BOILER TUBES



TESTS made on "SHELBY" SEAMLESS BOILER TUBES parallel to some extent the tests of actual service, and are a good indication of what may be expected under operating conditions. The ductility required for successful flanging, expanding and beading is well indicated in the illustrations above, as is the ability to resist the various forces present under operating conditions. While all of the tests shown were made cold, experience has proved that the same satisfactory results are obtained under the high temperatures and sudden changes of temperature found in actual service.

¶ "SHELBY" boiler tubes are singularly uniform, strong and ductile and are made by an organization with fifty years of experience in the manufacture of wrought tubular products.

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PACIFIC COAST REPRESENTATIVES: U. S. Steel Products Company San Francisco Los Angeles Portland Seattle

EXPORT REPRESENTATIVES: U. S. Steel Products Company New York City

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American Engineering Co.
Dake Engine Co.
Lidgerwood Mfg. Co.
Maritime Engineering & Sales Corp.

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National Tracing Cloth Co.

TRANSMISSION ROPE
(See Rope.)

TRAPS
(See Steam Traps.)

TRAVELING CRANES
(See Cranes.)

TROLLEY AND TRACK SYSTEMS
Brown Hoisting Machinery Co.
McMyler Interstate Co.
Whiting Foundry Equipment Co.

TRUCKS
Packard Motor Truck Co.
Towmotor Co., The.

TUBES
(See Boiler Tubes; also Condenser Tubes.)

TUBES, RODS, WIRES
(Copper, Brass and Bronze.)
Chase Metal Works.
Chase Rolling Mill Co.
International Nickel Co.
Standard Underground Cable Co.
Williams, Wm. E.

TUBE CLEANERS
(See Boiler Flue Cleaners.)

TUBE EXPANDERS
(See Boiler Flue Expanders.)

TUGS
(See Shipbuilders.)

TURBINES
(See Steam Turbines.)

TURNBUCKLES AND OTHER WIRE ROPE ACCESSORIES
American Engineering Co.
Broderick & Bascom Rope Co.
Durable Wire Rope Co.
Waterbury Co.
Williams & Co., J. H.
Williams, Wm. E.

TURNING ENGINES
American Engineering Co.

TURRET LATHES
(See Lathes, Turret.)

TWINE
(See Rope; also Cordage.)
Ajax Rope Co.
American Mfg. Co.
Columbian Rope Co.
Plymouth Cordage Co.
Samson Cordage works.
Waterbury Co.
Whitlock Cordage Co.
Williams, Wm. E.

TWIST DRILLS
Pratt & Whitney Co.
Rich Tool Co.
Standard Tool Co.
Williams, Wm. E.

UNDERWRITERS' AGENTS
Marine Corporation.

UNIONS
(See Pipe Unions.)

UPHOLSTERY
(See Ship Upholstery.)

UPHOLSTERY MATERIALS—WATERPROOF
Duratex Co.

VACUUM GAUGES
(See Steam Gauges.)

VACUUM PUMPS
Davidson, M. T., Co.
Dean Bros. Steam Pump Works.
Ingersoll-Rand Co.
Ross Heater & Mfg. Co.
Westinghouse Electric & Mfg. Co.
Wheeler Mfg. Co.
Worthington Pump & Mach. Corp.

VACUUM TRAPS
Crane Co., The.
Griscom-Russell Co.
Williams Valve Co., D. T.

VALVE DISCS
Goetze Gasket & Packing Co.

VALVE RESEATING MACHINES
Leavitt Machine Co.

VALVES
American Steam Gauge & Valve Mfg. Co.
Ashton Valve Co.
Crane Co.
Dew Valve Co.
Griscom-Russell Co.
Jerguson Valve Mfg. Co.
Lunkenheimer Co.
Manning, Maxwell & Moore, Inc.
Mason Regulator Co.
Powell Co., The William.

VALVES (AUTOMATIC RELIEF)
Dew Valve Co.
Pratt & Cady Co., Inc.
Sands, A. B., & Son Co.
Schutte & Koerting Co.
Union Water Meter Co.
Watson-Stillman Co.
Williams Valve Co., D. T.
Williams, Wm. E.

VALVES, AMMONIA AND CARBON DIOXIDE
Frick Co.
Pratt & Cady Co., Inc.
York Mfg. Co.

VALVES—CHRONOMETER
(See Chronometer Valves.)

VALVES—RUBBER
Powell Co., The William.
Pratt & Cady Co., Inc.
Sands, A. B., & Son Co.
Schutte & Koerting Co.
Williams, Wm. E.

VALVES—WATER
Chambersburg Engineering Co.
Crane Co.
Jerguson Gage & Valve Co.
Lunkenheimer Co.
Mason Regulator Co.
Powell Co., The Wm.
Sands, A. B., & Son Co.
Schutte & Koerting Co.
Union Water Meter Co.
Williams Valve Co., D. T.
Williams, Wm. E.

VAPOR PROOF FITTINGS
(See Waterproof Fittings.)

VENEER PANELS
Long-Bell Lumber Co.

VENTILATING FANS
(See Blowers.)

VENTILATORS
Morse Dry Dock & Repair Co.
Ohio Body & Blower Co.
Sands, A. B., & Son Co.
Schutte & Koerting Co.
Thacher Propeller & Foundry Corp.

VERTICAL PUMPS
(See Pumps.)

VESSEL BROKERS
(See Ship Brokers.)

VISES—CHAIN PIPE, CLAMP, MOUNT
Williams & Co., J. H.
Williams, Wm. E.

VOICE TUBES AND FITTINGS
Chase Metal Works.
Chase Rolling Mill Co.
Cory, Chas., & Son, Inc.
Rostand Mfg. Co.

WALKWAY GRATINGS
Irving Iron Works Co.

WALL RADIAL DRILLS
(See Radial Drills.)

WATER CLOSETS, MARINE
(See Plumbing.)

WATER COLUMNS
Crane Co.
Jerguson Gage & Valve Co.
Lunkenheimer Co.
National Tube Co.

WATER GAUGES AND ALARMS
Cory, Chas., & Son.
Crane Co.
Jerguson Gage & Valve Co.
Lunkenheimer Co.
Powell Co., The William.
Williams Valve Co., D. T.

WATER METERS
Union Water Meter Co.

WATERPROOFING FOR FABRICS
Robeson Preservo Co.

WATERPROOF LIQUID CEMENT
Ferdinand, L. W., & Co.

WATERPROOF LIQUID GLUE
Ferdinand, L. W., & Co.

WATERPROOF PAINT
Dixon, Joseph, Crucible Co.
International Composition Co.

WATERTUBE BOILERS
(See Boilers.)
Almy Watertube Boiler Co.
Heine Safety Boiler Co.
Ward Engineering Works, Chas.

WATER VALES
(See Valves, Water.)

WATTMETERS
(See Electrical Instruments.)

WELDING AND WELDING AND CUTTING APPARATUS AND SUPPLIES
(Oxy-acetylene Process.)
Metal & Thermit Corp.
Morse Dry Dock & Repair Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.
Vulcan Iron Works, Inc.

WELDING, ELECTRIC
General Electric Co.
Vulcan Iron Works, Inc.

WELDING METALS
(See Welding and Cutting Apparatus and Supplies.)

WELDING, REPAIRS
Cramp, Wm., & Son Ship & Engine Bldg. Co.
Metal & Thermit Corp.

WELDING RODS OF ALL KINDS
Camden Forge Co.
Cramp, Wm., & Son Ship & Engine Bldg. Co.
Metal & Thermit Corp.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.
Vulcan Iron Works, Inc.

WELDING WIRE
Cramp, Wm., & Son Ship & Engine Bldg. Co.
Harvey, Arthur C., Co.

WHARF CRANES
(See Cranes.)

WHARF DROPS
American Engineering Co.

WHISTLES
American Steam Gauge & Valve Mfg. Co.
Ashton Valve Co.
Crane Co.
Lunkenheimer Co.
Powell Co., The William.
Sands, A. B., & Son Co.
Union Water Meter Co.
Williams, Wm. E.

WHISTLE CONTROL
Cory, Chas., & Son, Inc.
Lunkenheimer Co.

WINCHES
(See Windlasses.)
Allan-Cunningham Co.
Mead-Morrison Mfg. Co.
Maritime Engineering & Sales Corp.

WINDLASSES
Allan-Cunningham Co.
American Engineering Co.
American Ship Building Co.
Bethlehem Shipbuilding Corp.
Dake Engine Co.
Flory, S., Mfg. Co.
Hadfield-Penfield Steel Co.
Hallidie Co., N.
Hush, H. J.
Hyde Windlas Co.
Kearfott Engineering Co.
Lidgerwood Mfg. Co.
Maine Electric Co.
Maritime Engineering & Sales Corp.
Mead-Morrison Mfg. Co.
Mundy, J. S., Hoisting Eng. Co.
National Hoisting Engine Co.
Rostand Mfg. Co.

WIRE (FOR ALL ELECTRICAL PURPOSES)
Benjamin Electric Mfg. Co.
Goodell-Pratt Co.
Habirshaw Electric Cable Co.
Page Steel & Wire Co.
Standard Underground Cable Co.

WIRE COVERINGS
Tubular Woven Fabric Co.

WIRE ROPE, CABLES AND ACCESSORIES
Ajax Rope Co.
American Engineering Co.
Broderick & Bascom Rope Co.
Durable Wire Rope Co.
Granger, George B., Co.
Waterbury Co.
Wickwire Spencer Steel Corp.
Williams, Wm. E.

WIRELESS APPARATUS AND TELEGRAPHS
Cutting & Washington Radio Corp.
Radio Corporation of America.

WIRING DEVICES
(See Marine Wiring Devices.)

WIRING MACHINES
The Quickwork Co.

WOODWORKING MACHINERY
Chicago Pneumatic Tool Co.
Cleveland Pneumatic Tool Co.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.

WRECKING CABLES
Ajax Rope Co.
American Mfg. Co.
Columbian Rope Co.
Plymouth Cordage Co.
Wall Rope Works.
Waterbury Co.
Whitlock Cordage Co.

WRECKING PUMPS
Dacidson Co., M. T.

WRENCHES
(Also Pipe Wrenches.)
Coes Wrench Co.
Williams & Co., J. H.
Williams, Wm. E.

YACHT BROKERS
(See Ship Brokers.)

YACHTS
(See Launches and Yachts.)

YELLOW PINE
Long-Bell Lumber Co.

YOKE CHRONOMETERS VALVES
Union Water Meter Co.
Williams, Wm. E.

ZINC DUST
New Jersey Zinc Co.
Williams, Wm. E.

ZINC PLATES
New Jersey Zinc Co.
Williams, Wm. E.

ZINC SHIP AND BOILER PLATES
Edes Mfg. Co.
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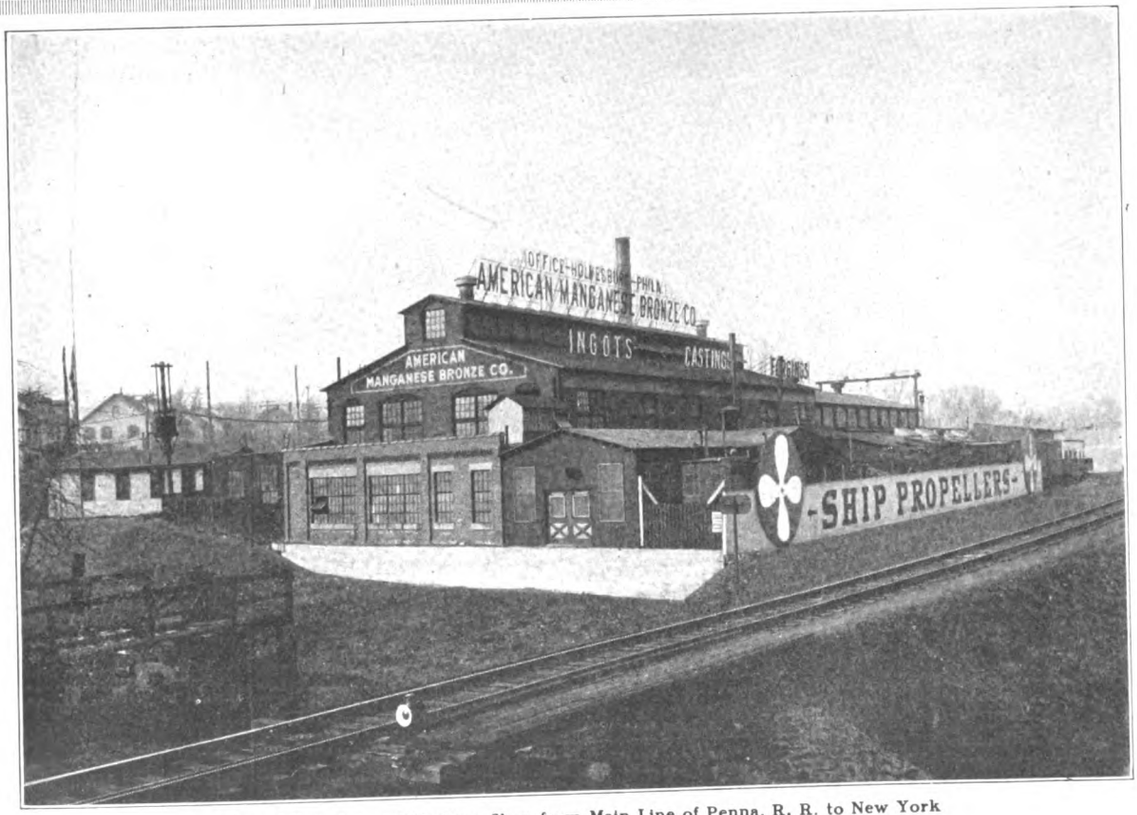

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View of Foundry and Machine Shop from Main Line of Penna. R. R. to New York

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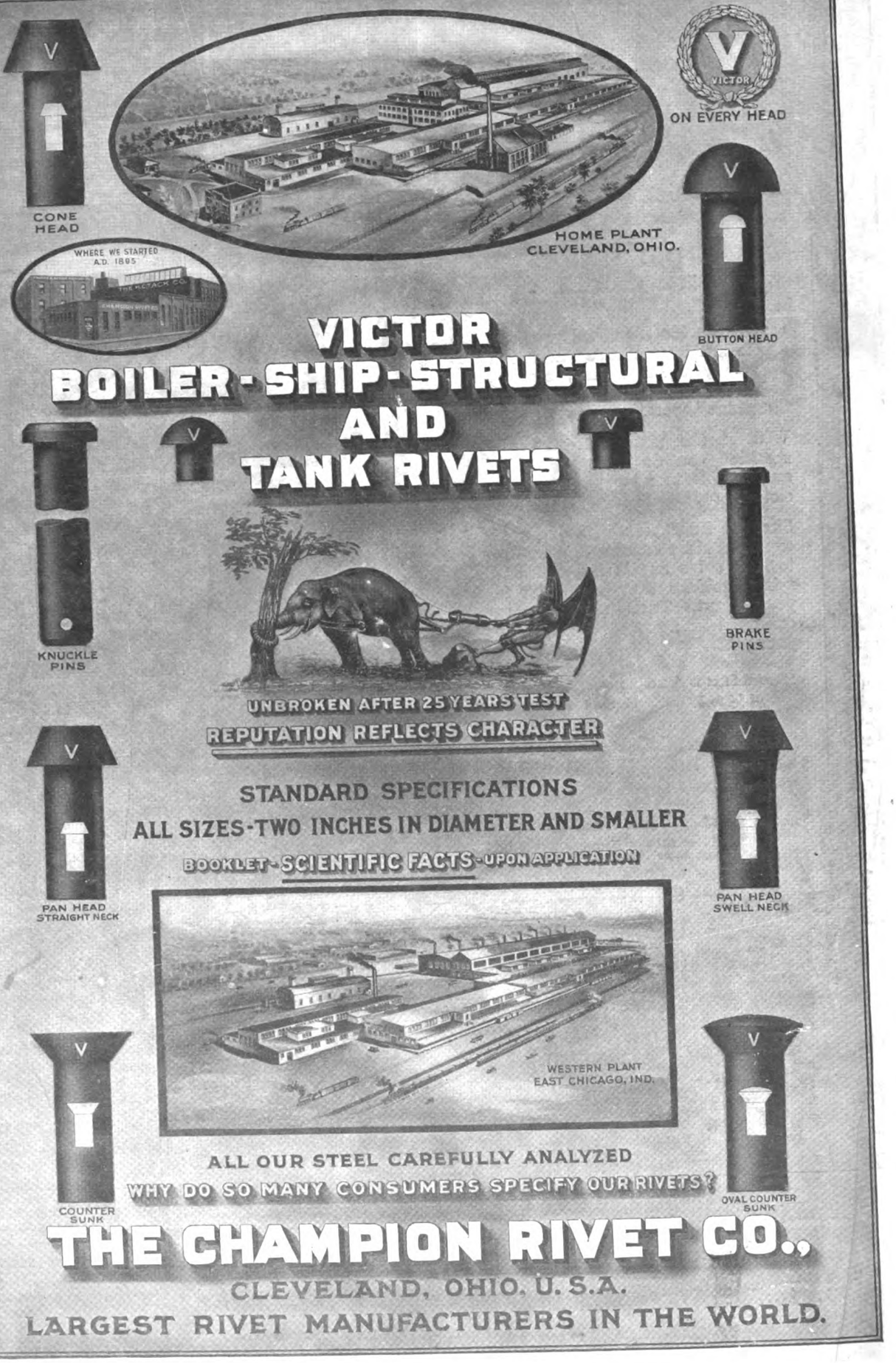
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